THERE is bound to be a bottom price. This applies to any commodity, and at this time we are thinking chiefly of chemicals. We have talked to many men in the chemical industry,—men who are interested in the plastic industry—and we have made a careful study of present trends and prices. Only one thing is certain; regardless of whether or not certain chemicals have hit their bottom price, the increasing demand for these products in old and new applications will result in definite improvements in manufacture. These improvements may mean an even lower cost of chemicals or they may mean a much greater cost. The decision, one way or another, is dependent upon the scope and adaptability of the chemical.

Yet to an outsider, the increased vision of the chemical man at this time should teach an important lesson. It is a fact that surplus stock does not mean price reduction, but a lowering of manufacturing costs and an increased selling effort. Thus does the chemical executive, if he is a sound executive, base his price on expanding markets and not on competition.

The new tariff should not, according to our elected spokesmen, hinder the progress of any industry; but it will. As a matter of fact it is doing so now. It is suffering enough to read Senatorial proclamations, but it is twice as bad when one must apportion the responsibility for lowered profits.

Now is the time for the chemical man to eye the future of his product and to lead in opening markets. Price cutting and unlimited credit will never aid a lagging industry.

The Publishers.

PLASTICS & MOLDED PRODUCTS

REG. U. S. PAT. OFFICE

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 6 SEPTEMBER, 1930 No. 9

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PLASTICS

(Reg. U. S. Pat. Off.)

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 6 SEPTEMBER, 1930 No. 9

Seaweeds in the Plastic Industries

How the basic ingredient of marine plants, known as algin, finds increasing use as a binder and component in composition products

By M. Deschiens

Chemical Engineer, (France)

CONSIDERABLE attention has been directed during the past few years to the utilization of the marine algae, or seaweeds. I have already written several articles on this subject. In my present article I desire to dwell particularly on the phases of the uses of these products as applied broadly to the field of plastics and related subject.

Algin

The mucilaginous substance derived from seaweeds, especially from a type known as laminaria, has been given quite a number of different names, such as mucus-acide laminarique (French), tangsäure (German), tangin (Danish), Norgine (Swedish and trade-mark name), algin and alginic acid (by Stanford, English) and tang acid or tanginic acid by Axel Krefting (English).

By whatever name it may be called, it is the same substance, being a pectin-like colloidal substance only very slightly soluble in either cold or hot water. It exists in the seaweeds (which are broadly termed algae) in the form of its insoluble calcium salt. The general process of extraction comprises the demineralization of the product (i. e. removal of the lime from it), followed by extraction of the algin or alginic acid from the residue by means of alkalies, sodium carbonate being preferred. The weeds swell up strongly in a solution of sodium carbonate. Finally the alginic acid passes into solution in the form of sodium alginate, while the insoluble cellulosic debris remains suspended.

Alginic Acid

By concentrating solution of sodium alginate, heavy viscous solutions can be prepared. These may be filtered by centrifugal means, or otherwise, to separate out the cellulose. From these solutions, acids will precipitate the insoluble alginic acid.

Free alginic acid thus obtained forms flocs that are colored green by the presence of chlorophyl. The acid can be bleached by means of hypochlorites or by repeated solution and precipitation. The acid may then be thoroughly washed, and compressed to remove most of the water. In this form it serves as the raw material for the manufacture of alginates.

This article is from our valued French contemporary *Revue generale des matieres Plastiques*, 1930, 6, 260-275.

Free alginic acid is heavier than water, although it can absorb up to 90% of the same. Its ammonium, sodium, potassium (and magnesium, Ed.) salts are soluble in water. The amount of alkali than can combine with the acid is independent of the temperature, but the speed of combination is greater when the reaction is aided by heat. Solutions of alkali alginates are viscous and stable. Alginic acid is not precipitated by tannins nor by heat. The alkaline earths (with exception of magnesium, Ed.), form insoluble whitish precipitates of alginates.

The heavy metal salts of alginic acid are usually colored, and insoluble in water. Iron alginate is brown, while copper alginate is a greenish blue. The latter is, moreover, soluble in ammonium hydroxide solution, the solution finding application in the treatment of grapevines to combat cryptogamous diseases of the latter.

Solutions of soluble alginates do not ferment or become spoiled.

Under pressure, at 150°C, 1% hydrochloric acid completely hydrolyses alginic acid forming undetermined products which in solution yield phenylhydrazine acetate, and well-crystal-

lized osazones melting around 260°C.

Calcium bisulfite solution, under pressure, also hydrolyses the alginic at 120°C, yielding crystalline products. A careful scientific study of these crystalline products were made by Freundler and the Messrs. Menager and Laurent, of the French "Office scientifique et technique des Peches maritimes" (Scientific and technical Marine Fisheries Bureau).

Constitution of Algin

According to these investigators, and also based on the work of J. Lelievre, the constitution of algin has been fairly well established. They consider algin as a glucoproteid containing a central nitrogen group to which are attached groups of carbohydrate chains having acidic functions, but which have lactone structure and are satisfied with inorganic groups forming salts. These carbohydrate chains appear to contain thirteen carbon atoms, and are linked together by semi-acetic linkages or in a manner similar to glucosides. The final carbohydrate chain, which contains the most oxygen, has the formula $C_{13}H_{20}O_{14}$. This chain has two acidic groups; does not reduce silver nitrate, and readily yields a molecule of oxalic acid on oxidation.

The rest of the prostetic grouping appears to correspond to the formula $C_{13}H_{20}O_{13}$, and on acid hydrolysis yields aldehydes or ketones. It may readily be detached from the pivotal nitrogen atom by treating bisulfited algae with alkaline carbonates, either hot or cold, which dissolve this group. Whereby itself, this group also has acid functions.

The pivotal nitrogen atom which appears to be linked with compounds in the cellulosic membranes of the seaweed, furnishes, on hydrolysis, by treatment with water under pressure, substances that are soluble in water, in acids as well as in alkalies. This compound is similar to one having either a tetainic or lactamic function. Therefore the pivotal center of algin includes a nitrogen atom and a lactonic or lactamic group hydrolysable with the liberation of a carboxyl group. As to the rest, the closure of the ring or chain is either a lactonic or lactamic bond, which is recognized more easily than to understand how it is linked up.

An age-old industry in Europe has been the collection of the sea-weeds that accumulate on the shores of northern Europe, France and Scotland. While considerable quantities of it were directly hauled to nearby farms to serve as an excellent manure providing potash, very much of it was dried and burnt, the ash being a salt high in potash and known as kelp. Gradually the name became attached to the seaweeds themselves.

The industry was comparatively small in the United States until recently, although Mr. Fred Conroy, of Scituate, Mass., has been collecting and selling various seaweeds, collectively termed "kelp", as well as 'Irish moss' for many years.

On the Pacific Coast, at San Diego, Cal., a large industry has arisen, and many tons of sea weed, particularly the giant kelp, are being converted into alginic acid and byproducts. This industry was started by Thornley & Co. about 1927. It is now Kelp Products Corporation.

Our French contributor is apparently not informed as to this company. His contribution to this interesting field is however so complete and valuable as dealing with a subject on which there is not much recent literature, that we deemed its reproduction in English to be both timely and worth while. (Editor.)

Finally, one may conceive of weeds as a complex of algin-iodide-alkali, having a distinct action on nitrogenous protoplasm. The chemistry of this complex body still presents many intricate problems.

History—Research—Patents

The algin industry is due to the Englishman, Stanford, who was interested in getting iodine out of seaweeds without destroying the valuable organic matter. His work falls into the last quarter of the past century. He received a number of British patents in 1881-1886 (Brit. P. 13,433 of Oct. 1885) and published several very complete and remarkable treatises on the subject of these seaweeds (On the economic applications of seaweeds, Society of Arts, 1862; Chem. News 1877, Vol. XXV; 1883, Vol. XLVII; J. Soc. Chem. Ind. 1885, Vol. IV; Pharm. Journal 1862; J. Soc. Arts 1883, Vol. XXXIII.)

He also suggested the carbonization of the seaweeds in a closed retort. His process consisted in disintegrating the seaweeds by means of sodium carbonate solutions, which dissolved the mucilaginous portions of the weeds. The soluble part was then precipitated by acids. The liquors strained from the precipitate contained the iodine and other desirable salts, from which solutions, by concentration, they could be recovered by ordinary means.

Further work was done by G. Laureau who in April 1894 (Brit. P. 6988 1894) macerated the algae with 5% solutions of sulfuric acid or 10% hydrochloric acid solutions, but mainly for the recovery of the iodine and salts while preserving the organic materials.

Krefting's Work

The Swedish chemist, Axel Krefting, in his British P. 11,-538 of May 7, 1896, concerning the treatment of algae, treated them with water containing from 1-6% of sulfuric acid, producing what he called "tang acid". The word "tang" is the German, Swedish, Danish and Norwegian name for laminaria. By analogy with the English nomenclature the word algin becomes tangin, and alginic acid tanginic acid. Krefting in further patents (Brit. P. 12,275 and 12,277, May 31, 1898) replaces the sodium carbonate

solution employed by Stanford with sodium hypochlorite or acid or alkaline solutions having a strength of from 2-3%.

In other addition patents, Krefting (Brit. P. 12,416, 13,151, 13,289, all of 1898) describes the filtration, maceration, etc. of algae with milk of lime.

The James process (Brit. P. 422 of 1897) was tried out in France in 1897, consisted in treating laminaria with seawater to which enough lime had been added to precipitate the magnesium salts, leaving the water slightly alkaline. The entire iodine, so claimed the inventor, passed with the treated sea water, while the seaweeds retained all their valuable organic constituents.

According to French Patent 352,069 (March 6, 1905) Madame S. H. Laureau treated seaweeds with burnt lime or milk of lime.

P. Gloess has conceived a process that he describes in his French P. 470,843, June 27, 1913 (and others) according to which he treats the organic material to get the bromine and iodine; first by treatment with an oxidizing agent (peroxide or chlorine) in an acid medium; secondly separating the organic from the inorganic residue.

According to a Norwegian process of Axel Krefting and the Societe Norgine (Norgine Co.), the organic constituents of the seaweeds are saccharified by means of sulfuric acid, although the "norgine" (algin) thereby loses most of its valuable properties.

Industrial Processes

The actual industrial processes depend upon a method washing of the dried seaweeds with water, either pure or slightly acidulated, whereby the greater part of the mineral constituents of the seaweeds is removed. The resulting demineralized organic product is then dried and ground.

In the Devieler process the seaweeds are methodically lixiviated with a solution of calcium hydroxide. The lime therein forms an insoluble alginate on the surface of the seaweeds, which prevents any solution of the organic constituents in the water. The iodine salts however pass into the lime water. After thorough washing, the residual material is dried and serves as fodder. (See Adrian, Sauvageau, Moreau and P. Gloss, in Bulletin des Inventions (France)). An analysis of this material shows the following results:

Carbohydrate	59 parts
Nitrogenous material	13 parts
Cellulose	11 parts
Fat and coloring matter	2 parts
Mineral matter	3 parts
Water	12 parts

Animals readily eat this product in admixture with oats, either with or without added molasses. The product sells about for the price of oats. In 1918 the French government purchased large quantities of this material, but at the end of the war the product remained in storage, and the factories changed their processes.

The liquors resulting from such washing of seaweeds are very dilute, and only contain about 0.5-0.6 kilograms of iodine per cubic meter. They can not be treated by ordinary methods of iodine recovery, partly because of their dilution, and because of the inevitable presence of organic matter. Follows a detailed description of iodine recovery methods, of no immediate consequence from the plastics and artificial materials industry).

In the subsequent portions of this article the commercial manufacture of algin and algin products will be taken up.

Pyroxylin-Coated Gelatin Sheets as a Substitute for Cellophane

THE great popularity of the transparent sheets of wraping paper commonly called "Cellophane" have led to many attempts to produce something similar in competition thereto. For many years sheets of gelatin have been employed for this purpose, but suffered from the one great defect—solubility and susceptibility to warping by moisture.

A Chicago inventor now proposes to make very thin gelatin sheets with a water-proofing layer of pyroxylin on both sides, thus combining the flexibility and non-inflammability of gelatin with the water-proof qualities of pyroxylin. The invention is patented by Marino Gentile, as U. S. P. 1,748,949; Mar. 4, 1930.

In carrying out the invention, one starts with a thin film or sheet of a protein substance, such as gelatin, casein or albumen, all of which substances are capable of being prepared in the form of a thin transparent film, and one then coats this film, preferably on both sides, with a solution containing cellulose nitrate as its chief ingredient. This coating solution may be prepared by first dissolving the cellulose nitrate in a suitable solvent such as ethyl acetate, amyl acetate, ether, etc., which yields a thick or viscous product, and then thinning the latter to a freely flowing state by the addition of a suitable amount of alcohol. To this cellulose nitrate solution is then added a non-hygroscopic material which renders the same soft and pliable, when dry, and also causes it to adhere evenly and uniformly to the gelatin or other protein film; the substance which has found best adapted to this purpose being castor oil. For practical purposes proportions of 40% to 60% of castor oil, by weight, of the dried coating of cellulose nitrate has proven to be satisfactory.

The coating solution can be applied to the base film or sheet in any suitable way, as by dip-

(*Continued on page 519*)

Regenerated Paper as a Filler for Plastics

How old newsprint and other waste paper can be turned into an excellent but cheap filler for most thermoplastic compositions

By Dr. Walter Obst

of Altona,--Bahrenfeld, Germany

While wood-flour is perhaps the most widely used filler in the resinoid plastics, yet the use of such fibers as cotton flock, asbestos and now regenerated paper lend certain desirable properties to plastic materials.

Our huge supply of waste paper makes the author's suggestions valuable.

IN the rubber industries the use of regenerated rubber has become standard practice, for rubber is too valuable a material to be discarded after a single use. During the World War, the use of regenerated rubber became an absolute necessity in Europe. The intensive development along these lines brought such perfection that regenerated rubber today is almost equal to new rubber.

The problem of the re-utilization of old paper is however somewhat different. In the case of rubber, price was not the only consideration, for in many cases the use of the regenerated rubber yielded results that were definitely advantageous.

Different Grades of Paper

Regenerated paper, however, is not always as good as new paper. Besides this, the cost of regenerating paper is considerable, and new paper is not so very expensive. Most paper-regenerating processes also did not fit very well into the standard practice of paper-pulp manufacture; and usually the product recovered was only good for making cheap dark-colored cardboard or wrapping papers. Furthermore, the fiber of regenerated paper was usually very short, and when strong papers were to be made, required the addition of new stock, to get the required strength.

There has, however, been considerable progress in this art recently. Not only have new processes for working up paper been developed, but many of these are applicable to old newspapers, and can be carried out at a reasonable cost. There have also been developed a number of artificial and plastic materials in which regenerated paper fiber plays an important part. The fibrous nature of the regenerated paper lends strength to the products made therefrom. Its use in connection with asbestos and similar mineral fiber is an indication of its use. In some instances mere comminution of the paper suffices; while good grades of regenerated paper stock may give rise to a whole new series of plastic materials.

Among the more recently proposed processes for the regeneration of old paper, we mention a few that appear particularly applicable and which can probably be worked at a cost that makes them commercial. Thus Richardson & Co., of Lockland, Ohio, describe a process (U. S. P. 1,707,604) for treating old paper pulped up with a solution of alkali and sodium sulfonate in the presence of a non-water-miscible solvent hydrocarbon. Thus 250 grams of old newspapers are soaked for a half an hour in a 6% sodium hydroxide solution; followed by addition of 1% of an organic sulfonate after which the mass is ground in a beater termed a "hollander" at 60-70° C. for a few minutes. After cooling down the mixture, 10 cubic centimeters of benzene (benzol) are added for every 400 grams of paper-water mixture, and the same is stirred until complete emulsification of the added solvent results. The mass is then poured into water, followed by sufficient heating to drive off the benzene. The impurities in the paper, such as the ink, collect on the surface of the water, while the purified regenerated paper pulp subsides in the water and is removed from the bottom of the mixture.

From our excellent German contemporary KUNSTSOFFE, 1930, 20, 106.

Method Tested

We have tested this method and find that it works very well; and that it is also economically sound as the benzene can be substantially completely recovered. There are no real technical difficulties, except perhaps the distillation of the benzene which is combustible. The process is perhaps a little more expensive than some of the other regenerating methods but the product is very clean and good.

A somewhat simpler process is that of the Twitchell Process Co., of Cincinnati, Ohio, who describe their method in U. S. P. 1,703,830 No hydrocarbons are employed; the process fits into existing paper-manufacturing practice, and yields a good product which is suitable, without drying, as a filler for plastics. For use in paper, a bleaching might be necessary.

According to this process, the shredded newspapers are simply

(*Continued on page 519*)

The World's Recent Progress in Synthetic Resins

A complete and condensed account of patents from the most important industrial countries

By Dr. Aladin

The patents that are listed here are all of recent origin and disclose the progress realized throughout the civilized world in this field. The dates, except in case of U. S. patents, are those of application. There will be a total of over 495 patents in this review. Publication began in April, 1929.

(Continued from August Issue)

XVII. Improving Natural Resins

1. By Esterfication

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
442	U. S. P. 1,660,094	J. Scheiber and W. Noack	Shellac substitutes	Mixtures of alphatic and hydroaromatic hydroxy-acids such as linolic acid, ricinolic acid, lactic acid, etc., are treated (either with or without condencing agents) with natural resins such as rosin, Manila copal, etc., to form lactide-type of product, the mixture being heated. By the use of sulfur, alcohol-insoluble infusible products can be produced. Varnishes made with these products yield very hard coatings.
443	German P. 440,003 Frdl XV, 1246	Chem. Fabriken Dr. Kurt Albert G. m. b. H.	Preparation of natural resins.	Phenolic resins are condensed with natural resins. The resulting resin-acids are esterified with alcohols or are neutralized with metallic oxides such as calcium oxide.
444	Brit. P. 201,916	Konsortium für elektro-chem. Industrie	Improving synthetic and natural resins.	Aldehyde resins are melted with organic hydroxyacids such as dioxystearic acid, ricinolic acid, dioxyobietic acid, salicylic acid, castor oil; or their derivatives. The product is a shellac substitute.
445	Brit. P. 252,715	J. Scheiber and W. Noack	Preparation of shellac substitutes.	See U. S. P. 1,660,094 (No. 442).
446	French P. 616,670	J. Scheiber and W. Noack	Preparation of shellac substitutes.	See U. S. P. 1,660,094 (No. 442).
447	Swiss P. 123,163	J. Scheiber and W. Noack	Preparation of shellac substitutes.	See U. S. P. 1,660,094 (No. 442).

2. By Other Methods

448	U. S. P. 1,583,014	E. Schaal	Preparation of a hard alcohol and oil-soluble resin suitable as a copal substitute.	For example a mixture of 100 parts of a resin or of rosin and 0.3 parts of cobalt acetate (or manganese borate or resinate) are heated with 40 parts of anhydrous sodium sulfate in the presence of air, until the product is as hard as desired.
449	U. S. P. 1,623,901	A. Amann and E. Fonrobert (to Chem. Fabr. Dr. Kurt Albert, G. m. b. H.)	Improving the properties of natural resins.	An excess of rosin is melted with phenol-alcohols or with phenol-aldehyde or phenol-ketone condensation products that have been made with basic catalysts. The reaction product is distilled off in vacuo and is then esterified at 250°C with glycol or glycerol; or is converted into metallic salts such as calcium, zinc or aluminum salts. The products are soluble and form a substitute for copal.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
450	U. S. P. 1,673,803	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	A natural resin such as shellac is dissolved in alcohol and the solution is mixed with wood flour and organic hardeners such as di- or tri-phenylguanidine.
451	U. S. P. 1,673,804	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	Instead of the organic hardener disclosed in No. 450 above, aldehyde-ammonia products are employed instead.
452	U. S. P. 1,673,805	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	Similar to No. 450, using amino-naphthalene derivatives as hardeners.
453	U. S. P. 1,673,806	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	Similar to No. 450, using secondary aromatic amines as hardeners; such as diphenylamine.
454	U. S. P. 1,673,807	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	Similar to No. 450, using heterocyclic compounds such as pyridine or pyridine pentamethylene-dithiocarbaminate.
455	U. S. P. 1,673,808	E. A. Daniels and H. S. Snell (to Western Electric Co.)	Hardening natural resins with organic compounds.	Similar to No. 450, using phenols, glycerol or naphthols or their alkali compounds; specifically sodium naphtholate.
456	German P. 420,918 Frdl. XV, 1240	L. Blumer	Purifying spirit-soluble Manila-copal.	Copal is treated with small amounts of a solvent such as amyl acetate, solvent naphtha, etc., by heating therewith under a reflux condenser. After a while the solvent is distilled off and the copal heated for some time to 200°C., and then filtered while still hot and molten.
457	German P. 434,419	Riebeck'iche Montanwerke A. G.	Oxidation of rosin.	Rosin is hardened by dissolving it in a volatile solvent and treating the solution in the presence of a catalyst such as metallic sodium with air or oxygen.
458	German P. 441,191 Frdl. XV, 124	Miles Novelty Co.	Making violin-rosin from ordinary rosin.	Rosin, together with up to 20% of gum sandarac, is dissolved in a solvent, the latter is then distilled off, and the residue is boiled with a small amount of linseed oil.
459	German P. 448,352 Frdl. XV, 1241	A. A. Schreiber and R. G. Israel	Preparation of valuable resins, especially copals, by treating resins with organic solvents.	Resin-containing substances such as wood, peat, sand, or scrap resins are treated successively with diverse solvents having a specific selective action on the resins. Thus, petroleum distillates extract a soft resin; while further treatment with aromatic or hydroaromatic mono- or polycyclic hydrocarbons or with halogenated or thionated aliphatic hydrocarbons, or mixtures thereof, extract a light-colored resin. Oxygen-containing organic solvents are finally employed to extract the balance of the resins.
460	Brit. P. 243,556	E. Schaal	Preparation of hard spirit-soluble and oil-soluble resins similar to copal.	See U. S. P., 1,583,014 (No. 448).
461	Brit. P. 259,030	Chem. Fabriken Dr. Kurt Albert, G. m. b. H.	Improving natural resins.	See U. S. P., 1,623,901 (No. 449).
462	French P. 596,339	Chem. Fabriken Dr. Kurt Albert, G. m. b. H.	Improving natural resins.	See U. S. P., 1,623,901 (No. 449).
463	Austrian P. 95,718	J. R. Köhler	Preparation of a shellac substitute.	Resinous products obtained from natural products such as turpentine, rosin, etc., by oxidation are employed. These comprise oxidized resin acids. Any crystalline byproducts therein contained are removed by treatment with benzene or oil of turpentine.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
464	Austrian P. 95,719	J. R. Köhler	Preparation of a shellac substitute.	The crude resin, such as pine resin, is extracted with a solvent so as to remove the crystalline constituents. Suitable solvents are benzene, benzine, oil of turpentine. The amorphous oxidized resin acids remain as an insoluble residue, which is the desired product.

XVIII. Improving Artificial Resins

(Compare also I, 3, Purifying phenol-aldehyde condensation products)

465	German P. 444,109 Frdl. XV, 1177 (Addn. to 416,904)	A. Voss (to I. G. Farbenindustrie A.-G.)	Preparation of oils and resins.	Artificial oils and resins, such as phenol-formaldehyde resins, are treated either with or without the aid of catalysts, with aralkylhalogenides such as benzyl chloride.
466	German 447,000 Frdl. XV, 1223	A. A. Samuel	Preparation of insoluble and infusible surfur-containing derivatives from phenols and formaldehydes.	A condensation product of phenol and formaldehyde is treated, while being strongly cooled, in the presence of an inert high boiling diluent, such as vaseline oil, with sulfur chloride a viscous product results, which, on heating in a drying oven, becomes hard and can be used as an insulating material in electrotechnical aplications.
467	German 456,820 Addn. to 391,072)	H. Bucherer	Preparation of derivatives of resinous alkali-soluble phenol-aldehyde condensation products.	Either or both alkali-insoluble-infusible, or soluble-fusible phenol-aldehyde resins are esterified with natural resin acids or with fatty acids having a high molecular weight. The resulting products in any case are soluble and fusible.
468	Norwegian P. 40,498	Konsortium für elektrochemische Industrie	Method for improving resinous polymerization products of aldehydes.	See Brit. P. 201,916 (No. 444).
469	Austrian P. 105,788	Bakelite Ges. m. b. H.	Preparation of soluble fusible phenol-formaldehyde resins.	Phenol-aldehyde resins made by means of alkaline condensation are treated with benzene-soluble organic acids, such as stearic acid, oleic acid, salicylic acid, etc.; or with the chlorides of said acids.

This article will be concluded in October with a comprehensive index
Total number of patents 495.

Patent on Furfural-Lignin Resins Donated to the Public by Inventor

OF great interest to all producers of molded products is an invention that the inventor donates to the government and the general public. It concerns a resin made from lignin, one of the constituents of wood, and furfural, the latter now available at low cost and in large quantities. As no phenol whatever is employed, the manufacture of the resin in accordance with this invention would appear not to infringe the rather broad phenol-furfural resin patents. The inventor is Max Phillips of Evansville, Wisconsin.

In U. S. P. 1,750,903; Mar. 18, 1930 it is stated that the application for this invention was filed April 6, 1929 and was made under the act approved April 30, 1928, and the invention herein described, may be manufactured and used by or for the Government for governmental purposes without payment to me of any royalty thereon; the invention herein described being dedicated to the free use of the public.

It is already known that furfural will condense with phenol or its homologues in the presence of a suitable catalyst to yield resinous condensation products. These resins are used in the arts as substitutes for the resins of the "Bakelite" type. Phillips found that if lignin is condensed with furfural in the presence of hydrochloric acid as a catalyst, useful resinous condensation products are obtained.

Lignin dissolves readily in furfural. When a furfural solution of lignin is heated to 100° C. and a catalyst such as hydrochloric acid added, the color of

(Continued on page 521)

Soft Plastic Resins Manufactured from Vinyl Acetate and Aldehydes

Products soft enough to be used in chewing gum described. New line of research opened, as these resins may modify properties of the harder resinoids

A plastic resin that under certain conditions is so soft that it can even be used as a substitute for chicle in chewing gum has been discovered while carrying on research work on vinyl esters condensed with aldehydes.

It would appear that this opens up a new line of research in the synthetic resin field, for perhaps these new products will eventually lead to the discovery of highly elastic resin which in admixture will be rather brittle phenolic resins would yield much tougher products.

Howard W. Matheson and Frederick W. Skirrow have discovered these resins. The patent (U. S. P. 1,746,665; Feb. 11, 1930) is controlled by the Canadian Electro Products Co. So great was the demand for printed copies of the patent that we only recently were able to get a copy of it.

If all that the inventors say is realized, we may soon be clamping our jaws on all-synthetic chewing gum and candy. As an indication of the wide field still open in resin synthesis, the patents herein described are very illuminating.

Condensation of Vinyl Esters and Aldehydes

This invention relates broadly to a process for the manufacture of resinous or gummy materials by the interaction or treatment of the esters of unsaturated alcohols or of hypothetical alcohols with aldehydes or aldehydic bodies, and to the product of such treatment.

In particular, the invention relates to a process for the manufacture of resinous of gummy materials by the interaction or treatment of activated vinyl esters with an aldehyde or aldehydic body and to the product produced thereby.

It has been stated in the literature and prior patents that vinyl esters may be polymerized by treatment in various ways. Catalysts such as hydrogen peroxide have been mentioned. Results obtained when working with vinyl acetate according to the instructions of prior patents were most erratic. Sometimes the ester would polymerize readily; at other times under equal or more favorable conditions substantially no polymer would be obtained. Investigation led to the knowledge that vinyl esters suitably treated with oxygen and preferably exposed to rays of natural or artificial light were active and would polymerize readily, whereas vinyl esters from which oxygen had been excluded during and after manufacture were inactive and would not polymerize. For example, vinyl acetate made with exclusion of air and then suitably exposed to oxygen and light would polymerize merely on standing under atmospheric conditions, whereas a part of the same lot of vinyl acetate not treated with oxygen and light would not polymerize on standing or by application of heat or heat and pressure, or even by heating with hydrogen peroxide at 100° C. under pressure for twenty-four hours. The degree of polymerization of active vinyl acetate was not greater using hydrogen peroxide as a catalyst than when no catalyst was used. The polymer, in either case, when isolated was found to be, as described in the art, a clear, hard, resin-like mass. (See Canadian Patent No. 226,694, dated November 28th, 1922, and U. S. Patent No. 1,586,803, dated June 1st, 1926).

The conditions applying to the polymerization of vinyl esters were found to apply also to the reaction of vinyl esters with aldehydes and aldehydic bodies such as acetals; that is to say, an inactive ester which would not polymerize would not react with aldehydes while an active ester which would polymerize would also react with aldehydes with or without catalysts.

Differ from the Vinyl Polymers

The products obtained by reacting vinyl esters and aldehydes are totally different from the polymers of the esters, as will now be shown. For example, if active vinyl acetate is polymerized by any of the methods given in the literature, a clear, hard, resinlike mass is obtained on removal of the unchanged vinyl acetate. This material is tough, hard and rubbery, and when dissolved in solvents such as ethyl acetate gives a very high viscosity product. The viscosity of such a body in solution of a known concentration is a good indication of the extent of the polymerization, and when the vinyl acetate is thus polymerized by the methods described in the literature the viscosity is practically the same for all methods, indicating that

(*Please turn to page 513*)

a very definite degree of polymerization is thus obtained. (This is further confirmed by the statements in Canadian Patent No. 265,172, dated October 19th, 1926, in which the polymer is claimed to contain 18-20 molecules.) It has been claimed in the literature (see U. S. Patent No. 1,586,803) that the utilization of organic solvents during the polymerization process alters the nature of the product, presumably by controlling the degree of polymerization. No difference is found in the degree of polymerization or the physical or chemical properties of the product by the use of solvents, the consistency, viscosity and nature of the polymerized body being the same in presence of solvents as if polymerized alone. The inventors have carried out the polymerization of vinyl acetate in the presence of acetone, alcohol, benzene, petroleum, ether, carbon-tetrachloride, butyl alcohol, glycol, glycerine, ethyl acetate, glycol monoethyl ether, acetic acid, camphor, butyl acetate and pyridine, and the finished products in all cases are substantially identical, provided that the unchanged vinyl acetate and the solvent used are completely removed, the material in all cases being a clear, hard, resin-like body of a rubbery nature when heated, which on heating does not melt but softens and becomes plastic, tough and rubbery. Furthermore, the material has a very high viscosity when dissolved in such solvents as ethyl acetate. The statements in the patent literature as to the variations in the polymer due to different solvents are apparently due to the incomplete removal of the unchanged vinyl ester or the solvent or both.

Water Absorption

The product made by treating active vinyl acetate with aldehydes, etc., by the methods to be described later, on the other hand, gives a very soft, resinous or gummy mass which at low temperatures is very britle and if masticated in the mouth becomes very plastic, taking up approximately 15% of water. The viscosity of the body dissolved in ethyl acetate, for example, is very low as compared to the same amount of polymer dissolved in the same solvent. Thus, using a 10% solution (10 gr. dissolved in 100 cc.) of the two bodies and a 20 cc. pipette, the following figures give the time of outflow at 20° C.;

	Seconds
Ethyl acetate alone	27
10% solution acetaldehyde-vinyl acetate product, (made from 100 pts. vinyl acetate and 12 parts acetaldehyde)	29
10% solution vinyl acetate vinyl polymer	133

Some Details

In carrying out the process according to this invention, the vinyl ester suitably conditioned is heated with an aldehyde or aldehydic body, such as an acetal, in presence or absence of catalyst and in presence or absence of water. Light it is found accelerates the reaction to a considerable extent. The addition of small quantities of water does not seem to have any marked effect on the reaction. already outlined, the physical properties of the bodies thus produced are entirely different from the polymerized products of the esters, and from analysis of the materials produced, a certain amount of the aldehyde enters into the reaction. The amount of aldehyde combining when 15 parts of acetaldehyde and vinyl acetate are used is from 3% to 5% by weight of the reaction product and may vary within considerable limits. It has furthermore been found that the softness and plasticity of the body, when definite products such as vinyl acetate and acetaldehyde are used, depend upon the amount of acetaldehyde added to the reaction mixture. Thus, for example, 100 parts vinyl acetate treated with 3 parts (by volume) acetaldehyde gives a body considerably softer and more plastic than the vinyl acetate polymer. If 12 to 15 parts of acetaldehyde are used, a much softer body is obtained. This latter body, when containing a normal amount of water (approximately 13% to 16%) is hard at 10° C. and soft, ductile and plastic at body temperature, namely, 37° to 38° C., and in respect of these properties is practically identical with gum chicle, except that it has greater ductility that the chicle. When anhydrous, this material becomes liquid on heating and at 75° C. is of the consistency of thin treacle and at 160° C. is a thin, limpid liquid. If 50 parts acetaldehyde to 100 parts vinyl acetate are use in carrying out the reaction, the produced body is softer, and in presence of water at body temperature is much softer and more plastic than is gum chicle. The melting point of the anhydrous material thus prepared is also considerably lower than if 12 parts, by volume, of acetaldehyde is used.

Differences in the Products

Furthermore, the nature of the body, produced from the given ester, depends upon the aldehyde; thus, for example, the product made by the treatment of vinyl acetate with butyraldehyde is considerably softer and more fluid, either alone or in presence of moisture, than is the body made from vinyl acetate and the same molecular percentage of acetaldehyde. Utilizing formaldehyde, the body is somewhat less soft and plastic than is that when utilizing the same molecular percentage of acetaldehyde. In general it would seem as if the softness and plasticity of the body formed increases with the increasing molecular weight of the aldehyde used. This applies particularly to the utilization of the normal aliphatic aldehydes.

In carrying out the reaction the vinyl ester admixed with the aldehyde is preferably treated at approximately 100° C. the pressure depending upon the vinyl ester and aldehyde utilized. The reaction, how-

ever, may be carried out without pressure at a great variety of temperatures from room temperature upwards and under a reflux condenser.

The following examples are given as illustrative of the invention, but it is understood that the same is not limited to the temperatures, catalysts or methods of treatment outlined.

Some Examples

Example I.—100 parts by volume of active vinyl acetate and 12 parts by volume of acetaldehyde are placed in an autoclave for three hours at a temperature of 100° C. The material is then allowed to run out of the autoclave into water and is steam distilled until all the unchanged vinyl ester and aldehyde are removed and recovered. The material thus obtained contains approximately 13% to 16% of water and is hard at 10° C. but soft, plastic and ductile at body temperature. If the water is removed, the material at a temperature of about 20° C. is a very brittle solid and is capable of again readily taking up approximately 13% to 16% of water. The material even when dry is plastic at slightly above room temperature.

Example II.—100 parts of active vinyl acetate are admixed with 12 parts of freshly distilled acetaldehyde and .01 parts of hydrogen-chloride. The material is then heated as in Example I for three hours. Approximately 80% of the materials used is recovered as a gummy, resinous mass on treatment with steam as in the previous example. The physical properties are the same as those of the product in the previous example.

Example III—100 parts of activated vinyl acetate are admixed with 12 parts of acetaldehyle and 3 to 10 parts of 3% hydrogen peroxide are added. On heating at 100° C. for three hours a similar yield is obtained to that given in Example II. The physical properties also are the same as those of the product in previous examples.

A multiplicity of examples might be given utilizing other aldehydes than acetaldehyde and other vinyl esters. Butyraldehyde, for example, when combined with vinyl acetate as in the examples cited above, gives a somewhat softer product than that from acetaldehyde. This product is softer both when anhydrous and when containing water. Various other esters might be used besides vinyl acetate, such as vinyl butyrate, vinyl propionate, etc., and similar results obtained, the properties, of course, varying somewhat with each combination used.

Furthermore, vinyl esters made utilizing other acetylenes than ordinary acetylene, such as those esters made from allylene, dipropargyl reacted with organic carboxylic acids, or substituted acids such as chloracetic acid, are intended to be included under the term "vinyl esters" and may be treated in accordance with the methods herein described.

May Be Mixed In

The materials produced in accordance with the above disclosure have, as already mentioned, a low melting point and are capable of taking up water and are found to be excellent substitutes for gum chicle in the manufacture of chewing gum, their degree of suitability, of course, varying with the raw materials used. A product made from vinyl acetate and acetaldehyde or butyraldehyde possesses excellent properties in this connection, having to a great degree the property of extensibility, especially in a moistened condition, great plasticity during mastication, insolubility, freedom from taste and smell, and is capable of mixing with gum chicle in practically all proportions.

Thus, although the material itself may be utilized alone in place of chicle, it has the advantage of also being capable of being admixed with the present base for chewing gum. The product also can be admixed with all the ordinary constituents utilized in the manufacture of chewing gum, such as flavoring, sweetening materials, etc.

It may be pointed out that when only a small percentage of an aldehyde is used—for example, 3 parts acetaldehyde to 100 parts of vinyl acetate—undoubtedly a mixture of vinyl polymer and the reaction product of vinyl acetate and aldehyde is obtained. This is more or less evident from the fact that the material producted is of a somewhat rubbery nature and possesses a certain degree of resiliency. If the wet material is drawn into threads and the tension then released, the material contracts and distinctly exhibits what is called elastic memory. When 12% of acetaldehyde, for example, is used with vinyl acetate, the material when containing the normal amount of water, may be stretched into threads and has no recovery or elastic memory whatever in distinction from the material which contains a certain amount of polymer. It may also be pointed out that, if the polymer is prepared separately and a small percentage —say 10%—is admixed with a soft vinyl acetate-aldehyde product, such as that made with 15 volumes of acetaldehyde and 100 volumes of vinyl acetate, this mixture has different physical characteristics to the action product, in that although it may be soft enough to utilize as chewing gum, the material exhibits certain properties characteristic of the polymer, namely, a certain amount of elastic memory and a certain resiliency on being masticated.

Hardening the Resins

This invention, therefore, contemplates not only the main reaction product as described, but the utilization of the polymer itself when admixed with a suitable amount of the softer reaction product of vinyl esters and aldehydic bodies.

Products of different consistencies made as herein described are freely miscible to

(*Continued on page 523*)

Technical Applications of Rubber Latex

English translation of comprehensive German work now available to American readers. Covers all phases of important subjects.

By Carl Marx
Editor, PLASTICS

Latex. Its Occurrence, Collection, Properties and Technical Applications, by Ernst. A. Hauser, Ph. D., Frankfurt a/M with Patent Review by Carl Boehm von Boernegg, Ph. D., Frankfurt a/M. Translated by W. J. Kelly, Ph. D., Philadelphia, Pa. Published by The Chemical Catalog Co., New York, 1930.

ALTHOUGH rubber has been known for four centuries, and an immense literature has accumulated on the subject, most of the latter has concerned itself with the rubber resin itself and its vulcanization and fabrication into the countless articles of commerce into which this important raw material enters.

The basic raw material from which rubber is derived, is the sap of certain trees and plants. This is called broadly "latex," and the rubber is obtained from it by coagulation. The rubber itself exists in the latex in the form of extremely small particles, more or less pear shaped, the latex being a sort of colloid suspension of the rubber in addition to other non-rubber constituents.

An Ancient Art

In the very early days of the rubber art, latex itself was utilized, but the difficulties in transportation soon led to its abandonment, and only the rubber itself, won by crude and imperfect methods by native processes carried out at the rubber plantations.

Within the past ten years, however, latex has again sprung into prominence and its use for producing plastics, rubber products and impregnated fabrics is rapidly increasing.

The literature on latex has been widely scattered through the literature, hence the appearance of this book was very timely. It was published in German in 1927 and the present (1930) English edition is a very welcome addition to the literature on this subject.

The book is well written, and is not only full of valuable information, but, what is rather rare in technological works, is entertaining and interesting reading.

Historical Review Very Interesting

The historical introduction makes one wonder if there really is anything new under the sun. Most readers, having but a casual acquaintance with latex, will probably be of the opinion that it is something "new". But Dr. Hauser, in this historical chapter, shows us that latex and the rubber derived from it, are a real American product, for excavations carried out by Dr. Gann in British Honduras disclose the most interesting fact that the Mayas, those remarkable early American peoples, knew of rubber, and used it to construct rubber balls shaped like our modern basketball, and played a game with it bearing a striking resemblance to that game.

The first authentic account of rubber dates back to a report of Pietro Martyre d'Anghiera in 1525. The author of the present book under review recites, and quotes from, many such early reports—in fact the 19 pages of historical review read like a romance, and should interest everybody who likes to know the origin of things.

Dr. Hauser, on p. 15, quotes at length from British patent 3110 of 1864, of Silver and Hancock, stating that it is probably the most complete early resume of the applications of latex. In the opinion of the reviewer, this chapter alone is worth the price of the book.

The second chapter is an excellent botanical treatise on the gutta-percha and balata trees, from which important resins closely related to rubber are derived. This chapter alone includes three pages of references to the physiological importance of latex.

The third chapter is devoted to the methods of collecting latex, especial attention being given to that of Hevea Brasiliensis, the most common of the rubber trees. Many illustrations of the approved methods of tapping the trees are reproduced. Throughout, as in all the other chapters, all statements are supported by copies literature references.

Structure of Latex

The fourth chapter is perhaps the most interesting to the colloid chemist, for it goes into great detail regarding the structure of latex, and its appearance under the ultra microscope. Many fine illustrations of the almost sub-microscopic rubber particles existing in the latex in the disperse phase mark this chapter. Methods, illustrated by the apparatus used, of investigating latex, are described. Inasmuch as a proper understanding of the colloidal properties of latex makes its industrial applications more certain and successful, the complete

treatment of this phase of the subject matter is to be welcomed.

Chapters V and VI deal respectively with the non-rubber constitutents of latex, and the less important "latices" (the plural evidently preferred by the author—although the term seems confusing because of its similarity to the plural of the word 'latice"; — "latexes," though perhaps not such good etymology would seem preferable to American ears.

Coagulation of Latex

A short chapter (VII) is devoted to the methods of coagulating the latex; while a well illustrated chapter (VIII) deals with primitive as well as of modern methods of preparing "whole latex rubber". Prominently mentioned are the Kerbosch, Wickham and Cockerill processes. Considerable space is given to the now highly successful spray drying of latex developed by Hopkinson, in which the latex is dispersed in a conical chamber (wider at the bottom) by a rapidly rotating disc into a downwardly directed current of highly heated deoxygenized air. The latex falls as a white powder, that is continuously removed from the bottom of the dryer by providing the latter with a slowly moving continuous floor.

Chapter IX deals with the preservation and shipment of latex, an industry that is assuming importance. The next (X) chapter concerns itself with the concentration of latex, including such methods as those of Traube; centrifuging, filtration and evaporation.

The vulcanization of latex forms the eleventh chapter, while twenty pages (chapter XII) deal with the industrial applications of latex. Many references are cited. Some of the subjects covered are: making crepe rubber, spray methods, impregnation of fabrics and cords; manufacture of spread goods, dipped goods, vulcanized latex and the application and handling of concentrated latex, etc.

The final chapter (XIII) is an excellent account of the internal structure of rubber.

Patent Literature

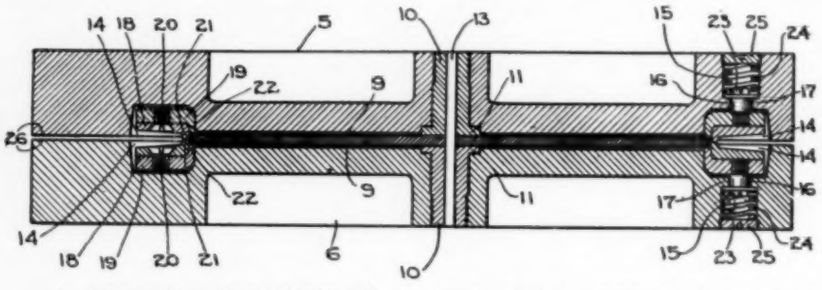
A most important part of the book is the appendix in which the co-author, Dr. Börnegg, gives concise but sufficiently detailed abstracts of all British and German patents on latex and its utilization (latest date March 17, 1927). Thirty pages are devoted to this alone. The omission of the very large United States literature is to be regretted. Perhaps later editions will fill this gap.

The work concludes, in true workmanlike fashion, with a complete author and subject index—but, it is to be regretted

(*Continued on page 523*)

New Phonograph Record Mold Solves Flash Problem

THE difficulties in preventing excessive flash in the molding of phonograph records has claimed the attention of inventors for many years, because the waste was considerable, and further because the re-use of once-pressed plastic composition was not considered the best of practice.



An invention that limits the amount of flash was recently assigned to the Columbia Phonograph Co. of Bridgeport, Conn., by Eric J. Haffling. (U. S. P. 1,749,713; Mar. 11, 1930.)

The invention relates to improvements in pressing or molding means and methods such as are used in the manufacture of phonograph records and has specific relation to dies for this purpose.

Dies for this purpose usually include channels for the passage of steam and cold water whereby the dies may be alternately heated and cooled, to enable of the pressing and setting of the molding material. This material is usually thermoplastic such as shellac compositions and cellulose esters, although other materials such as artificial resins are also used in the manufacture of sound records. In use, a matrix having the sound grooves therein, is secured to the die and heated or cooled as required.

Any method of heating and cooling may be employed in connection with the present invention, which has particular relation to the manner of securing the matrix.

In the accompanying drawing, there is, for the purpose of illustration, shown one embodiment of the invention. Many changes will readily suggest themselves to those skilled in the art, and it is therefore to be understood that the drawing and the following detailed description is by way of illustration only.

In the drawing:

Fig. 1 is a plain view of a die having the invention applied thereto; and

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Referring in detail to the drawing, there is shown a pair of dies 5 and 6, inlets and outlets 7 and 8, for the heating and cooling fluid being shown in Fig. 1. The path of travel of the

heating and cooling fluid through the dies is not shown, since this forms no part of the present invention, and any desired heating and cooling arrangement may be used. Each of the dies 5 and 6 carries a matrix 9, the matrices being arranged in opposed relation.

The faces of the dies against which the matrices are clamped incline outwardly and downwardly from their central portion. The central portion of each of the upper and lower matrices 9 is clamped to the respective dies by means of bolts 10 having the edge portion of their heads 11 beveled as indicated, and engaging the beveled surfaces of the matrices. These bolts 10 have openings 13 therethru, for the passage of centering pins. While this particular means for holding the central portion of the matrix may be used it is immaterial to the present invention, the only requirement being that some satisfactory means be provided for accomplishing this purpose.

In their outer portions each of the dies is provided with a circular depression or groove 14, in their opposed faces, and with sockets 15 in their exposed faces. Apertures 16 extend through a web 17 formed between the grooves 14 and the sockets 15 to provide a passageway from the sockets through to the grooves.

Matrix Clamping Ring

Disposed in the grooves 14 comprising upper and lower parts 18 and 19 respectively secured together as by means of screws 20 is the matrix clamping ring. Since the means for clamping the matrix to each of the dies is the same, a description of one will suffice for both. The upper portion 18 of the clamping ring includes a lip 21 adapted to be disposed over the outer edge portion of the shoulder 22 of the lower portion 19 of the clamping ring whereby the outer edge of the matrix is securely clamped between said parts and record material is prevented from entering under the edge of the matrix.

A bolt 23 has its head disposed in a socket 15 and extends through the opening 16 and has threaded engagement with the clamping ring. Disposed in the socket is a coil spring 24 bearing at one end against the head of bolt 23, and contacting with a plug 25 at its other end. This plug is threaded into the socket and its position may be varied, to vary the pressure of the spring, should that be found necessary.

In operation, when the dies are apart, the springs 24 act to move the clamping rings outwardly whereby the rings are spaced a slight distance from the bottom of the circular grooves 14, and the outer edge portion of the matrix is raised a slight distance away from the face of the die, as, for example, twenty one-thousandths (20/-1000). This, of course is partially due to the face of the die being inclined. The surface 26 of the die at the outer side of the depression 14, is of such height as to form a landing so that when the dies are fully closed, and the clamping rings have been forced in against the action of the springs 24, the portions 26 of the respective dies will be in contact. From this it will be seen that the surface of the matrix is disposed below the surface of the landings 26 a distance equal to the thickness of lip 21 of part 18 of the clamping ring.

In the molding operation, the material may be placed on the lower matrix near the center thereof in the form of a biscuit, and as the dies are slowly closed, the central portion of the matrix will first engage the material and will spread it over the matrices. Formerly, as the dies closed, a portion of the material escaped out of the press beyond the clamping rings, since the material may tend to move in one direction and not move in circular form over the matrices. Poor product would result, since there would not be sufficient material remaining between the matrices for full pressure to be applied. This was true because the clamping rings prevented the matrices from moving closer together than twice the thickness of that portion of a clamping ring projecting over the edge of the matrix.

With the present invention however, lips 21 of the clamping rings come together before any considerable pressure is applied to the material, and serve to lock the material in the die, and cause it to completely fill the space bounded by the rings and matrices. Later should there be a surplus of material, it will force its way out between the contacting portions of the rings, when the full pressure is applied. However, since the quantity is carefully regulated, the surplus will be inconsequential, and full pressure will be applied to the material.

After the lips 21 of the clamping rings have come into contact, further pressure is of course applied to straighten the matrices against the dies and the clamping rings move into the grooves 14 against the action of springs 24, the pressure of the contact between the portions 21 constantly increasing. By the time the final pressure is applied to the material between the matrices, the opposed surfaces or landings 26 of the upper and lower dies are in contact, and the clamping rings are fully within the recesses or grooves 14.

What is Patentable in Plastics?

WE HAVE RECENTLY RECEIVED A MOST INTERESTING MANUSCRIPT BEARING THE ABOVE TITLE. IT IS BY OUR ADVISORY EDITOR, Mr. CHARLES W. RIVISE. EVERYBODY IS INTERESTED IN WHAT PROTECTION HE MIGHT GET ON AN INVENTION HE MAY MAKE OR HAS MADE. THIS ARTICLE ANSWERS THE QUESTIONS. IT IS WRITTEN FROM A PATENT-LAW POINT OF VIEW, AND IS A MASTERFUL STATEMENT OF THE FACTS. IT WILL BEGIN IN THE OCTOBER ISSUE.

Technical Abstract Section

A Concise Review of Patents and Literature

Production of Stencil Sheets. Armand de Waele, of London, England, assignor to D. Gestetner, Limited, of London England. U. S. P. 1,749,241; Mar. 4, 1930.

Stencil sheets having a coating composition or ink-resisting medium the main gelatinized constituent of which is a gelatinized cellulose ester in intimate association with a gelatinized organic colloid dispersible in water.

The process of producing stencil sheets adapted to be stencilized by pressure which comprises isolating a cellulose ester in an organic liquid emulsifying the resulting sol in an aqueous medium and coating a highly porous sheet material with the emulsion thus obtained.

Phonograph Record. Isidore E. Neft, of Los Angeles, California. U. S. P. 1,751,166; Mar. 18, 1930.

A phonograph record disk having an extension projecting inwardly from the inner extremity of the sound groove thereof to cause inward movement of the stylus of a phonograph, said disk being provided with a wholly independent outwardly directed inner groove the walls of which are adapted to engage the stylus and move it outwardly.

A phonograph record disk having an extension projecting inwardly from the inner extremity of the sound groove thereof to cause inward movement of the stylus of a phonograph, said disk being provided with an outwardly directed inner groove surrounding the center of the disk and spaced from said extension, the walls of said inner groove being adapted to engage the stylus and move it outwardly.

Molding Apparatus. Nels L. Olsen, of Highland Park, Michigan, assignor to American Rubber Products Corporation. U. S. P. 1,750,424; Mar. 11, 1930.

In a device of the type described, a movable ram, a stationary head, a separable mold secured to said ram, a core secured to said head in alignment with said mold, a frame supported between said ram and said head and movable relative to both, said frame adapted to engage said mold during the work stroke of said ram whereby to prevent separation of said mold, a cam member pivotally mounted on said frame, spring means constantly urging said cam member to rotate in one direction, and a member pivotally secured to said head adapted to engage said cam member upon movement of said frame member toward said head whereby to turn said cam member and compress said spring and thereby resiliently urge said frame member into close relationship with said mold.

Nitrocellulose Liner. Lorin B. Sebrell, of Akron, Ohio, assignor to the Goodyear Tire & Rubber Company, of Akron, O. U. S. P. 1,749,743; Mar. 4, 1930.

A unit consisting of plies of unvulcanized rubberized material alternating with plies of liner material treated with nitro cellulose containing an ester of phthalic acid.

A unit consisting of plies of unvulcanized rubberized material alternating with plies of liner material treated with nitro cellulose containing an aliphatic ester of phthalic acid.

Method of Producing Alkyl Esters of Abietic Acid. Alan C. Johnson, of Kenvil, New Jersey, assignor to Hercules Powder Company, of Wilmington, Delaware. U. S. P. 1,749,483; Mar. 4, 1930.

The method of producing the amyl ester of abietic acid, which includes heating abietic acid, an alkali, and an amyl halide under pressure in the presence of a solvent for both the amyl halide and the ester to be produced, separating the alkali halide formed from the solution of the ester formed and distilling off the ester under reduced pressure.

Resin From Crude Gutta-Percha and/or Balata. Alfred Brewerton Craven, of Selby, England. U. S. P. 1,751,724; Mar. 25, 1930.

The process of manufacturing a solid resin from a sticky semi-fluid resin extracted from gutta percha and from balata, consisting of the steps of mixing one per cent of resinate of manganese with said semi-fluid resin, heating and agitating said mixture and passing a current of air therethrough while agitated.

Chromium Film-Forming Element. Henry E. Van Derhoef, of Rochester, New York, assignor to Eastman Kodak Company, of Rochester, New York. U. S. P. 1,746,751; Feb. 11, 1930.

A cylindrical element for use in the manufacture of films from dopes containing cellulosic derivatives and having a hard smooth peripheral surface upon which film-forming dopes may be deposited and from which the films may be readily stripped,

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said surface comprising a supporting metallic backing, a polished nickel surface integrally united to a supporting backing and an outer layer of chromium, and said chromium layer being adherent to said polished nickel surface and possessing a corresponding polish which it imparts to a film formed therein.

Process For the Etherification of Carbohydrates. Otto Leuchs, of Elberfeld, Germany, assignor to I. G. Farbenindustrie Aktiengesellschaft, of Frankfort-on-the-Main, Germany. U. S. P. 1,746,663; Feb. 11, 1930.

In the process for the etherification of carbohydrates involving the treatment of the carbohydrates at reacting temperatures with an etherifying agent, the step which consists in carrying out the etherification in the presence of a desiccating agent maintained out of physical contact with the carbohydrate.

In the process for the etherification of carbohydrates involving the treatment of the carbohydrates at reacting temperatures with an etherifying agent, the step which consists in carrying out the etherification in the presence of fused calcium chloride.

GELATIN WRAPPERS PYROXYLIN COATED

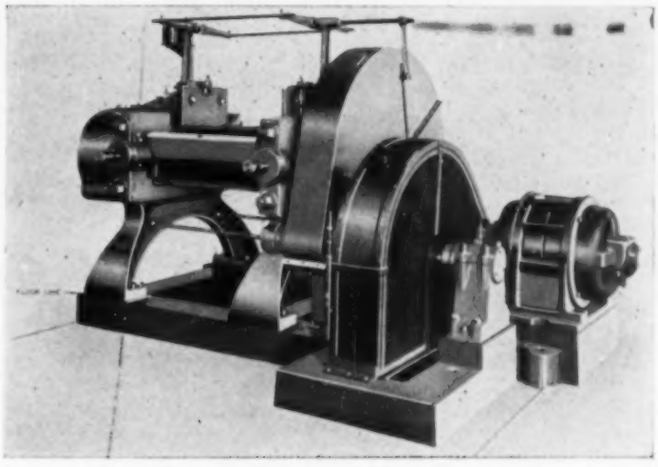
(*Continued from page 503*)

ping the base sheet in, or drawing it through a body of the coating solution, or by flowing the latter over, or brushing it on, the base sheet. When the coating or covering has dried, the resultant product is a tough flexible, transparent sheet of greater strength for the same thickness than either gelatin or gun cotton alone, less combustible than ordinary paper, nonporous and impervious to dust, grease and moisture and thus excellently adapted to serve the purpose of a sanitary wrapper or container, especially for food products, medicines, and the like, and low in cost of materials and manufacture.

REGENERATED PAPER AS A FILLER

(*Continued from page 504*)

boiled with a solution of from 0.5-1% of mineral sulfonic acids, by which the sizing and printing ink is completely removed from the paper. After draining off the solution, the regenerated cellulose is very thoroughly washed, and may



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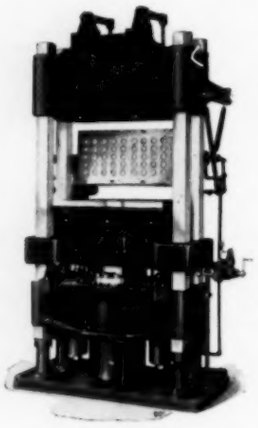

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then directly be formed into new paper. The manipulations are all simple and well known in the paper-making art. The sulfonic acids are those obtained by the treatment of oils with sulfuric acid; such oils as sulfonated castor oil, and sulfonated petroleum and other mineral oils being indicated. Sulfonated tar oils, shale oils, etc., may be used.

The uses of the regenerated paper fiber are many, including of course the well known pulp products such as papier-mache. In the subsequently mentioned products the paper fiber is a filler in plastics.

Using Oil

Thomas, of New York, mixes regenerated paper-pulp in the form of a freely flowing aqueous suspension with 12% of an oily substance immiscible with water; drains off the water, and forms the resulting plastic mixture under pressure and heat. The added oil may be oxidized or chlorinated. When the product is merely dried without pressure, one obtains a water proof heat insulating material; while when formed under high pressure an electrical insulating material results. Other fibers may also be added, although merely the use of the regenerated paper fiber yields an excellent product.

If waterproof cardboard and paper is to be made, bituminous substances may be added if desired. There are quite a number of patented processes in this field. Vulcanized fiber can be manufactured from regenerated paper, and by the admixture of artificial resins valuable plastics can be produced. Molded pulp articles for packing boxes, etc., can be made in this manner. When mixed with asbestos, brake blocks can be produced.

Similar to the oil-saturated products of Thomas, are the materials described by the Hycolite Liquid Wallpaper Co. Ltd., of London in its British Patent 303,292; where mention is made of oil-saturated paper pulp for the manufacture of cork-substitutes and linoleum. The oils

used are linseed oil or kapok oil. Mineral additions comprise kaolin, (clay) and gypsum, etc.

Robert Scherer, of Vienna, according to an Austrian patent, coats cardboard with the well-known Sorel cement (magnesium oxychloride) and forms it into a stone sheet substitute or uses it for flooring.

Wide Utility

In fact there would be no novelty in mixing regenerated paper pulp with any kind of binder, such as magnesia cement, bitumens, artificial resins, etc., for the manufacture of floor-coverings, wall-surfacing and a general line of moldable plastics. The addition, in such cases, of micro-asbestos (asbestine) would be an improvement. The latter would yield a more solid product having a less porous and smoother surface. I can recommend a trial of the asbestine in admixture with regenerated paper fiber in every case. The excellent finish given plastic materials in general by the use of this micro-asbestos or asbestine is remarkable, and it appears destined for wide application in asbestos cements, stone-like plastics, concrete, etc. It will prevent formation of hair-like fissures and cracks in such products. The material is cheap and hence has a real future in this field.

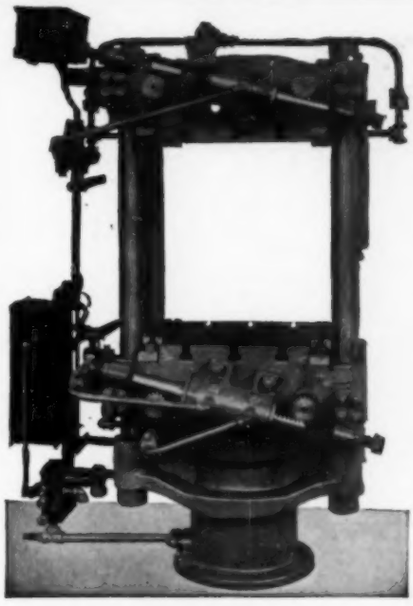
Many more instances might be cited, but I believe I have indicated sufficently the wide range of utility of regenerated paper in plastics. Much has already been done in this field in the United States, where enormous quantities of old paper are available.

Furfural-Lignin Resin

(*Continued from page 507*)

the solution changes at once from brown to black and a reaction takes place resulting in the formation of a black resinous condensation product.

Example No. 1.—Ten parts of furfural. 10 parts of lignin, and 0.5 part concentrated hydrochloric acid are heated together



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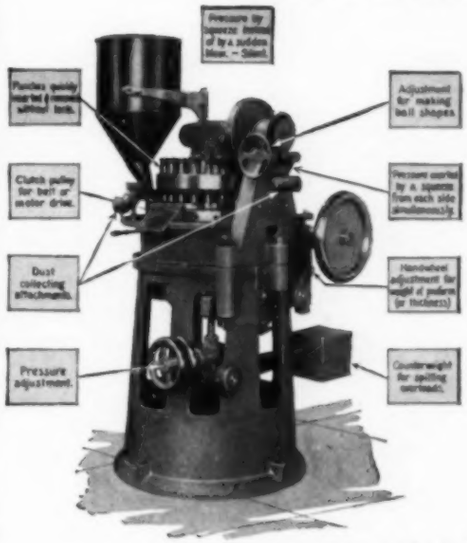
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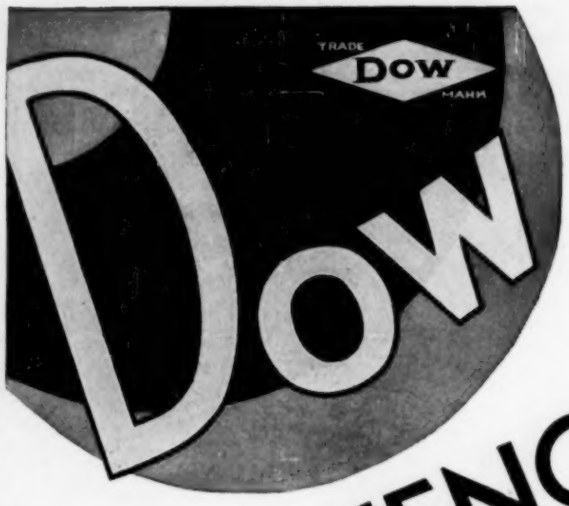

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for 1 hour in an oil bath maintained at 150° C. The product when cooled to 25° C. is a black brittle resin.

Example No. 2.—Ten parts of furfural; 10 parts of lignin, and 0.5 part concentrated hydrochloric acid are heated together for 2 hours in an oil bath maintained at 150° C. The product when cooled to 25° C. is black, hard, brittle resin.

Example No. 3—Ten parts of furfural; 30 parts of lignin, and 0.5 part concentrated hydrochloric acid are heated slowly in an oil bath up to 150° C., and then maintained at this temperature for 1 hour. The product when cooled to 25° C. is a black, very hard brittle resin.

Example No. 4—Thirty parts of furfural; ten parts of lignin, are heated together to 120° C., then 0.5 part concentrated hydrochloric acid is added, after which heating is continued at 150° C. for one half hour. The product when cooled to 25° C. is a black resinous condensation product.

Example No. 5—Thirty parts of lignin; 20 parts of furfural, are heated together in an oil bath at 130° C. for ½ hour with stirring. The mixture is then allowed to cool to 80° C. and .5 part of concentrated hydrochloric acid is added and the mixture is heated in an oil bath to 130° C. in the course of 1 hour. The product when cooled to 25° C. is a black resinous condensation product.

The claims cover:

1. A process of preparing new and useful resinous condensation products, consisting in heating furfural and lignin in the presence of the catalyst.

2. A process of preparing new and useful resinous condensation products, consisting in heating furfural and lignin in the presence of hydrochloric acid.

3. A process of preparing new and useful resinous condensation products, consisting in heating furfural and lignin in the presence of hydrochloric acid at a temperature of more than 100° C.

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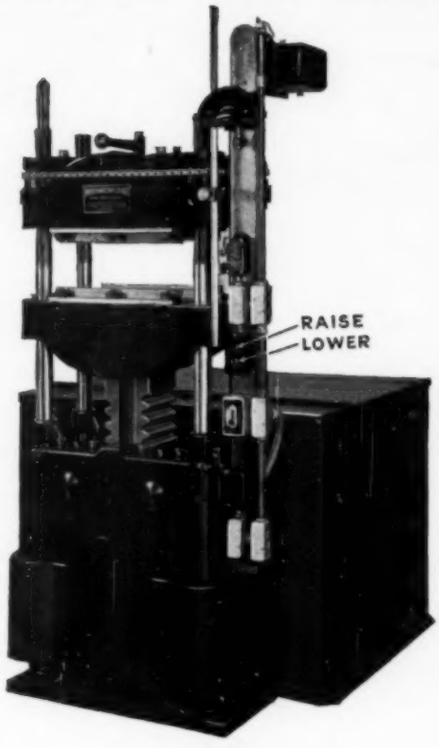

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LATEX

(*Continued from page 516*)

that the indexer did not also index the patents.

The French, Dutch and Austrian patent literature is also omitted, the author stating that "the inventions of other countries, particularly the United States and France, have usually been patented in England and Germany if they were of sufficient importance". The reviewer, from his experience as a patent attorney and searcher of the literature for these many years, can not subscribe to these views. Most Americans, shortsightedly perhaps, fail to patent their ideas abroad.

As a means for searching the novelty of any process, the present patent compilation is therefore not sufficiently complete.

The reviewer is acquainted with a very fine complete compilation of the U. S. and other patents on latex made by an Examiner in the U. S. Patent Office, but this work exists only in manuscript form, and hence is too expensive for wide distribution.

However, Dr. Hauser's book as excellently translated by Dr. W. J. Kelly, is most highly recommended to all who desire and need good reliable information on Latex.

SOFT RESINS

(*Continued from page 514*)

produce mixtures of desired consistency. Thus, a soft product may be rendered physically harder by incorporation of a suitable amount of a harder product or a hard product may be softened by addition of a softer product. Incorporation of vinyl ester polymers is found to have a hardening effect on soft reaction products.

It has been discovered also that the nature of the vessel in which the reaction is carried out has a marked influence on the result. Vessels of glass, porcelain, enamelware or aluminum enable the realization of

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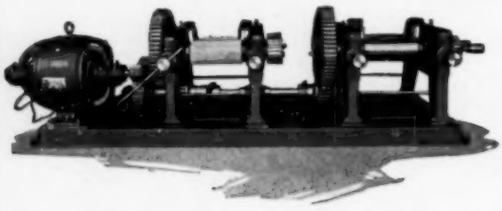

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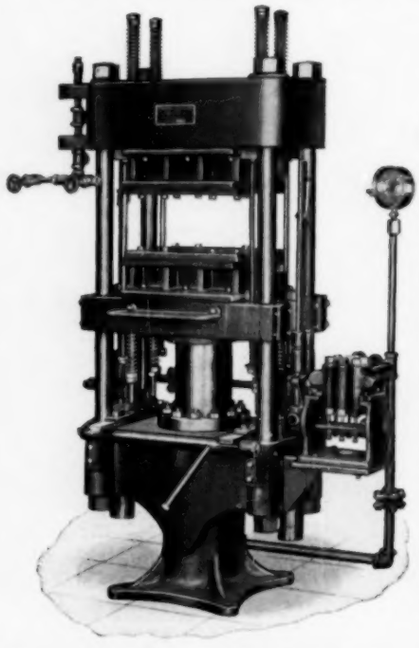

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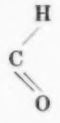
the desired results, but vessels of iron and copper are found to be most unsuitable and impossible of use. Apparently, these materials or their salts serve as deactivators of the active vinyl ester.

Under the term "aldehydic bodies" is intended to be included all bodies having the grouping distinctive of aldehyde, namely:



All such bodies are useful to a greater or lesser extent although the saturated aldehydes of the aliphatic series are found to be the most satisfactory. Furthermore, bodies of the acetal type give reaction products of the same type as that given by the corresponding adlehydes. Any body may be utilized for carrying out the reaction which will yield an aldehyde under the conditions of carrying out the same, provided that they do not also generate other materials that inhibit the reaction or deactivate the vinyl ester.

The claims cover a process which includes reacting together an activated vinyl ester and an aldehydic body. There are 22 further claims of somewhat lesser breadth.

Light as a Catalyst

In a second patent, by Skirrow alone (. S. P. 1,746,615), the use of light as a catalyst is described. This second invention relates broadly to the manufacture of synthetic gummy or resinous materials by the interaction or treatment of vinyl esters with saturated aliphatic aldehydes or aldehydic bodies, the term "vinyl esters" as herein used including vinyl halides.

According to the second invention, the reacting bodies are subjected to the action of rays such as obtained from the sun or from an arc or other suitable lamp substantially without application of heat and pressure and the reaction goes more rapidly and completely than when using heat and pressure

only. A source of light which has been found satisfactory is an ordinary mercury vapour arc lamp and a vessel satisfactory for carrying out the process is one composed of ordinary pyrex glass. The rays effective in promoting the reaction are thought to lie largely in the visible spectrum. Ultraviolet rays have been found to be comparatively ineffective, their action having been tested by utilizing a quartz tube as contained and a suitable screen for filtering out the visible rays of light. With sufficient intensity of light, the reaction will take place at atmospheric temperature or slightly higher and without pressure, but heating and pressure may be resorted to.

When using more than five parts of aldehyde to 100 parts of vinyl compound, it is found that a better yield of product is obtained when using light than is obtained from the use of heat and pressure alone.

Apparatus suitable for carrying out the reaction consists of a pyrex container connected to a reflux condenser or a container of porcelain, enamel or aluminum associated with tubes of pyrex glass through which the reaction mixture may be circulated for exposure to light. Vessels of iron and copper are found to be unsatisfactory.

Example I

One part of acetaldehyde and 100 parts of vinyl acetate (by volume) are placed in apparatus of the character described and maintained at a temperature around 30° to 40° C. for a period of sixteen hours. Unreacted ester and aldehyde may be removed by distillation preferably with steam and approximately 10 parts of product will be obtained, which is hard at ordinary temperatures but is tough and rubbery when warmed.

Example II

Proceeding as in Example I but using two parts of aldehyde to 100 parts of vinyl acetate, approximately 40 parts of product are obtained.

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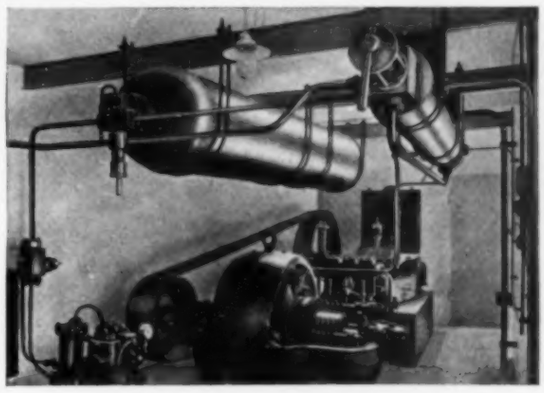

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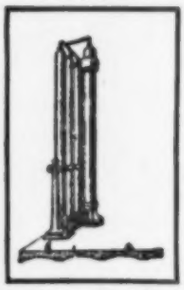

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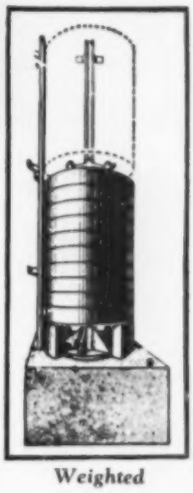

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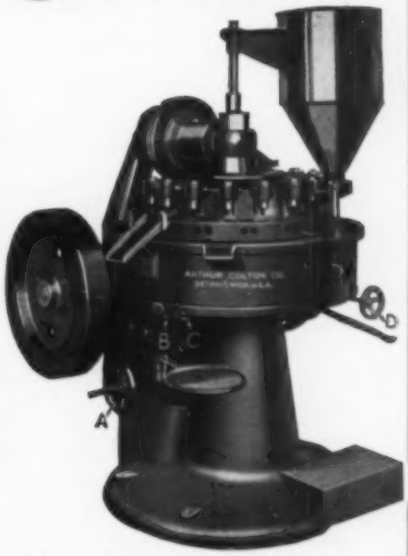

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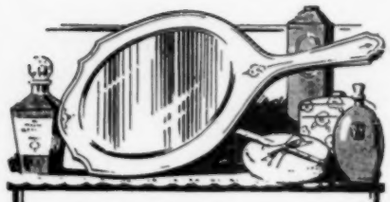

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Vol. 4 **SEPTEMBER, 1930** **No. 9**

The March of the Molded Closures

After a conquest of the Cosmetic Field the Resinoids advance upon Food Products, Shoe Creams and other Packaged Wares

By Zaida A. Ellis

Bakelite Corporation

LIKE a victorious army, certain of its resources, the phenol resinoid closures continue to invade new territory. In the cosmetic field, formerly held entirely by glass stoppers, corks, and metal caps, molded covers for bottles and jars have firmly entrenched themselves. Now, from this point of vantage, come scouts to explore the surrounding territory.

One strictly practical field hitherto unexpoited is that of shoe polish containers. The exceedingly attractive invader is the Kydet' Shoe Creme bottle with Bakelite molded cap, modern in design as the slippers to which the cream is applied. Following the mode for colored footwear, this polish has been produced by the Barton Manufacturing Company in twenty or more shades. It is packaged in a diamond-facetted bottle designed for the Turner Glass Company by Walter Dorwin Teague, a "desire creation expert", whose services are regularly retained by such firms as Thomas A. Edison, Inc., and Eastman Kodak. The Bakelite molded closure was chosen by Mr. Teague as the perfect finish for his modernistic bottle, which is beautiful enough to hold an honored place in any museum of art.

A Modernistic Flacon

Into "no man's land" marches another scout, the "Handy Flacon", product of the Owen-Illinois Glass Company. This flask has been welcomed by both dry and wet partisans as a handy overnight container for a gargle, mouth wash, or tonic stimulant. It is an interesting example of modern glass design. The raised lines may have found their inspiration in the criss-cross structural work of the skeleton of a skyscraper, or perhaps in the sweep of the cables of a suspension bridge. And here again, pointing the way to a wider range of resinoid usefulness, is a closure of Bakelite molded.

In the food container field a small start has also been made in the way of food packaged for table use. Small, but powerful, one might say, for McIlhenny tabasco sauce appears in a most piquant little bottle of Turner glass, appropriately capped with a pepper-red resinoid closure. And in another field, closely related, glass salt and pepper shakers have made their appearance, bearing colorful molded caps.

With crisp cut diagonal lines meeting to form light reflecting facets and diamond shaped planes, the Kydet' Shoe Creme bottle establishes its claim to modernity. The black and gold label leads the eye upward to the octagonal closure of black Bakelite molded.

Splendid progress, indeed— the

molded closures seem to have the metal caps and covers on the run. Phenol resinoid fans can predict, without any display of over-confidence, the same victories in the whole field of closures which have now been made in some special divisions. History repeats itself. Look back over the past ten years of progress in packaging cosmetics and toiletries. Just about a decade ago, the Bakelite Corporation investigated the possibility of using Bakelite Molded for the tops of collapsible tubes and bottles. One large user of collapsible tubes went so far as to have experimental molds made from which several thousand caps, the commanders of the molded closure army—a small one, then—maneuvered to obtain the most strategic position before making a commercial invasion of the field. With the passing of time, a number of changes took place, each enabling molded closures more satisfactorily to compete with metal. Principally, the art of fabricating Bakelite Molded was greatly improved. Now it is possible to produce a gross of tube caps in one operation—complete in every detail—intricate surface design, interior or exterior threading, color, surface finish—ready for the package when they come from the press.

Bakelite closures are today the rule rather than the exception for such products as tooth paste, shaving cream, cold cream, and toilet water. Wherever eye appeal is a salient sales factor, cosmeticians and manufacturing chemists find resinoid closures a silent and powerful aid.

Cost Limitations

Not all branches of the packaging industry offer the same encouragement for the increased use of molded closures. In the packaging of cosmetics, a luxury product, cost is not such an important factor as in the packaging of food, a necessity commodity. In preparing canned food for the market, increase in cost of only a few cents per gross on a certain brand may make a great decrease in the yearly sales volume. For foods which must be heated and seasoned before serving, tin cans are still the cheapest of the satisfactory containers. Food packers are now convinced of the value of eye appeal to the housewife, however, and yearly the number of glass jars and bottles used in the canning industry increases. Green peas, scarlet beets, and yellow carrots in clear glass jars have an appeal with which no lithographed label on a tin can may compete. But even when the glass jar has superseded the tin can, the metal cover is still satisfactory for food which is to be prepared in the kitchen. That the cover is usually destroyed in removal is unimportant, as the food is almost immediately used, and the container discarded.

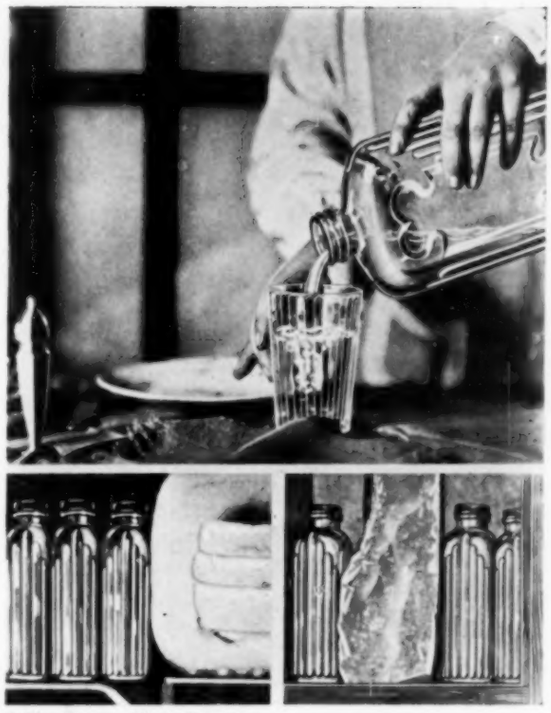
There are other classes of food products, however, which are best kept in the original bottle or jar, and for these—from an artistic standpoint at least—molded closures are needed. It is with regard to the containers of these ready-to-serve foods, jams, jellies, marmalades, pickles, catsups, etc., that glass manufacturers and canners have combined to anticipate and meet the modern woman's desires. Given two brands of equally good marmalade, to choose from, one in an ordinary wide mouth glass bottle, and one in a jar attractive in design as a perfume flacon, and there will be little hesitancy in the buyer's choice. A marmalade or salad dressing jar possessing a beauty of line which will insure its welcome appearance

This glass jar, designed by Walter Dorwin Teague, and manufactured by the Turner Glass Company, could not be included in the Metropolitan Museum display of modern glassware because the standard type metal cover was considered not beautiful enough to fittingly complement the glass.

In the design of the "Handy Flacon," with its molded Bakelite cap, is carried out the spirit of this modern age. The criss-crossed upward sweeping lines may be interpreted as telegraph wires, radio antenna, skyscraper structural work, or bridge suspension cables.

As fitting accompaniment to a tender steak, McIlhenny tabasco sauce appears in a most piquant little bottle of Turner glass, appropriately capped with a pepper-red molded closure. Owens-Illinois glass salt and pepper shakers with green molded tops may be used to complete the savory ensemble.

All photos courtesy of Bakelite Corp.



Courtesy of The Turner Glass Company.

A most convenient refrigerator bottle, with a blue enameled screw cap of tin. Several bottles of this shape may be nested together against the ice or ice drawers of a refrigerator insuring plenty of cold drinks for hot summer days. But—metal caps rust in a moist atmosphere. Here, indeed, is a molded closure needed.

among the silver, crystal, and china of a well appointed table is naturally more to be desired than one whose contents must be emptied into another dish before serving. Obviously, there is the same need for an attractive cover on such a jar as there is for the resinoid cap on the tabasco bottle.

Glass and Molded Resinoids

Modern glass designers have put careful thought into the designs for marmalade and pickle jars, and candy containers now appearing on the market. Beauty has been considered with relation to the purpose for which the container is to be used, the material from which it is to be made, and the manufacturing processes employed in producing it for the market. Thus, one of the tendencies of the modern food packer is to favor the low, broad based type of container, with the center of gravity close to the table. The reason for this is purely practical. A tall, slender jar may be very beautiful, but it upsets more easily than its shorter companion. Moreover, the last delicious spoonful is removed more easily from a jar shorter in height and larger in circumference. With regard to material, when glass is the working medium, there is a natural tendency to modern art. Glass has great beauty of its own, and modernistic crisp cut angles and sharp line contours intensify this beauty by the production of light reflecting facets and flashing planes. In considering the manufacturing process, the designer must go farther than the manufacture of the glass. He must study step by step the canning and packaging processes—filling, cooking, sealing, and wrapping.

In the same way must the resinoid closure be studied to see if it can rightfully claim the practical advantages of the tin caps, plus the beauty of the molded ones. Artists prefer resinoids for the greater variety of design possible. In the first place, a bottle is no more beautiful than its stopper or cover. If the design of the closure is not harmonious, or if the material is cheap in contrast to that used in the container, then the effect is incongruous—much like an unbecoming hat on a lady otherwise beautifully attired, or, shall we say, like a gentleman, dressed in sartorial perfection for evening, who selects a much-beloved fishing hat to complete his costume. Metal hats for bottles restrict the artist. No matter how modernistic the glass design, with the upward trend in line which distinguishes the modern American viewpoint, the little tin closure remains practically the same. In direct contradiction to the vertical lines of the bottle, the screw threads of the cap go horizontally round and round. The use of phenol resinoids solves this problem, for the inner and outer surfaces of a phenol resinoid closure can be distinctly different. One need have no relation to the other. The molding process will give to the inner surface the continuous thread detail, and to the outer surface the same interesting design gained in the bottle itself. With molded closures, more distinctive shapes may be had—designs that are really the artist's own.

Color Combinations

The color effects obtained through use of phenol resinoid closures make another point which appeals to the designer. Most glass bottles, especially those for food containers, are crystal clear, leaving color to be incorporated in the package through the attached label. When closure matches label in hue, a most attractive tie-up is obtained. The Kydet' black and gold label, diamond shaped, leads the eye directly upward—first, to the parallel lines making the neck of the bottle octagonal in shape, and from them to the black molded closure, also octagonal, whose vertical lines are designed to meet those of the bottle neck.

In versatility of design, and in pleasant color range, the molded resinoids thus demonstrate their fitness to complement glass. There is also a certain likeness in quality—a soft, rich smoothness about both res-

(*Continued on page 542*)

Why Plastics?

The *Industrial Bulletin* of Arthur D. Little, Inc., tells what they are, how they are made, and the uses to which they are put

IN a recent address before the Pacific Division of the American Association for the Advancement of Science, Dr. Wilson Compton, Executive Secretary of the National Lumber Manufacturers Association, made a striking comparison between the long-established industry represented by his Association and the plastics industry which in point of age might be considered as still in our industrial nursery. Dr. Compton's statement was that the aggregate value of the products of the plastics industry is already more than one-tenth that of the products from both the lumber and the woodworking industries of our country.

Doubling Annually

To those who have been in touch with this industry in recent years, Dr. Compton's statement causes no surprise as the volume of the plastics business in this country has practically doubled each year, and the editors of PLASTICS estimate that for the current year this amount will exceed one-quarter of a billion dollars. The industries now known as plastics comprise, in the main, two groups—those devoted to the manufacture of certain plastic materials and those which convert this material to finished products.

The importance of manufacturing processes based on plasticity of the raw materials is that they make possible conversion directly to the desired final shape, with practically no loss of material, and at an expenditure of time and labor which is usually only a fraction of that which would be required if the part were shaped from rough stock by machining or cutting operations.

Among the more common forming operations of this sort are casting, molding, die casting, sheet metal stamping, drop forging, rolling, and extrusion. Processes of this type are characterized generally by a relatively high cost for the initial manufacturing set-up which, however, when spread over a large number of pieces imposes a comparatively small burden on each. Often it is found profitable to spend thousands of dollars for equipment to manufacture a part that is sold in the "ten cent store."

Following up the obvious advantages of these plastic-forming operations as applied to our older and in many instances natural raw materials, we now have the extensive group of new and, in the main, synthetic materials which are now known as "plastics." Several of these, such as cellulose nitrate ("celluloid") and the shellac base plastics, have been in common use for many years, and it was not until the discovery and spectacular development of the phenol formaldehyde resins of the Bakelite type that the fabricating industry generally began to recognize the importance of this type of materials and to place them in a class by themselves.

What the Plastics Industry Includes

The longer known plastic materials are not generally included when speaking of the plastics industry. The important materials of the group now generally considered as plastics, and in which the remarkable extension of use noted in our opening paragraph is taking place, are those natural and synthetic resins and cellulose esters and ethers (cellulose nitrate and cellulose acetate are the best known of the esters) which may be caused to assume a definite shape either by a chemical reaction or by the influence of heat and pressure in a metal mold.

The simplest class of plastics are those made of natural gums, waxes, shellac, and asphalts with or without drying oils in combination with inert fillers such as wood flour, asbestos, or finely ground clays. These were first used as a raw material for a wide range of small articles of the type of buttons, as well as phonograph records and the less expensive type of radio parts. Although this class of materials is basically not resistant to heat, asphalt compounds of this type have been developed with a surprisingly high flow point. In this connection it is interesting to note the transition which the past five years have seen in the method of manufacturing containers for storage batteries. This design has successively changed from a wooden case containing molded rubber jars for each cell, first to a molded one-piece hard rubber case, and now to a similarly formed one-piece case made up entirely of an asphalt base compound of which one hundred million pounds are being used this year for this purpose alone. Included in this same classification are the so-called cold molded products which are pressed into shape from a powdered molding compound and then fluxed under heat after being removed from the mold.

Dairy and Packing House Products

The casein plastics are based on the fact that casein, a by-

product of the milk industry, when treated with formaldehyde, forms a tough horn-like substance. While this material is softened by heat, it does not become sufficiently plastic to mold readily. As a rule, this material is first formed by pressing or extrusion into sheets or rods which are subsequently softened by immersion in oil and then pressed into relatively simple shapes. The casein plastics take an excellent polish, are relatively inexpensive, non-inflammable, and beautifully colored mottled effects may be obtained. The material is, however, quite hydroscopic, and should not be used where conformation with close dimensions is required.

The albumen and their closely related hemoglobin or blood plastics resemble in many ways the casein plastics. Although possessing substantially better molding properties, they are used principally for the manufacture of small molded parts. They have a structure which is sufficiently porous to permit dyeing more readily than many of the other plastics.

Cellulose Base Material

The oldest of the plastics are those derived from nitrocellulose or pyroxylin. Although this material is non-heat resistant, it has the great advantage of a high degree of flexibility, and the widest varieties of articles are made from it, ranging from toilet articles to photographic films and auto curtains. One of the most important uses of the sheeted pyroxylin is in the manufacture of safety glass for automobile enclosures in which nearly 3,000,000 lbs. of sheeted stock will be used this year as the sandwich material between layers of glass.

The major disadvantage of this material is its high inflammability, which has been an important factor in bringing forward the development of the closely related product, cellulose acetate, which is almost non-inflammable. On account of its lower degree of plasticity, this material is used largely in sheet form and its major use at the present time is in the manufacture of safety films.

Synthetic Resins

The last important group of plastics, which, however, appears to be still in its infancy so far as varieties are concerned, is the class in which synthetic resins are used as a binder. The earliest of these and by all odds still the most important are the phenolic resins of which Bakelite is perhaps the best known. This material combines extreme plasticity in the formative period with a finished product resistant to practically all of the normal conditions tending to structural breakdown, a high degree of electrical insulation, and an attractive surface requiring practically no polishing as it comes from the mold. Structurally, the material possesses great strength and where this is not adequate, as in the case of fine machine threads, it is possible to mold metal threaded inserts into the finished piece.

Increased Heat Resistance

An important classification of plastics as regards their use is their resistance to heat. The earliest plastics, such as cellulose nitrate, as well as the majority of the natural gums and resins, soften to such an extent under heat as to seriously limit their field of usefulness. One of the major factors which has brought about the rapid extension in the use of the phenolic resin plastics is the extent to which they resist not only heat, but also other conditions, such as moisture and mild acids and alkalies which tend to break down the appearance, and frequently the structure, of many materials.

The production of synthetic resins for the current year is variably estimated between 50 and 90 million pounds, this being consumed in the manufacture of parts of every conceivable shape and use from buttons and handles to furniture and wall panelling. The recent expiration of several basic patents in this field has led to intensive research in the development of new plastics of this general type, many of which are already on the market, but which for lack of space cannot be discussed further.

The history of man has been written in the "ages" of the materials from which his handiwork has been largely fashioned. If we may gauge the future by even current progress, we appear to be rapidly entering the plastic age.

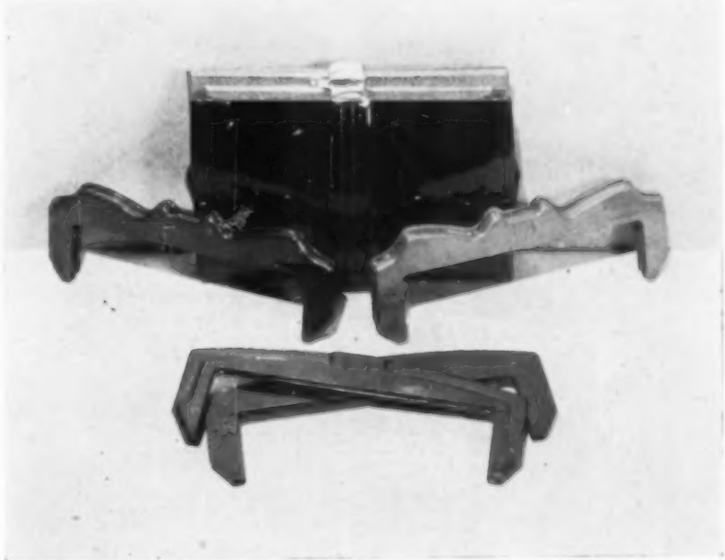


Photo courtesy Bakelite Corp.

Beauty, and such essential qualities as strength and mar-proof surface, are found in handbag frames of Bakelite molded. These frames are made in an interesting variety of designs and colors.

Profits From Depression

By Charles F. Reeves
Vice-President-Sales, Celluloid Corp.

At this moment countless business executives are **thinking.** For months they have been confronted with unusual problems caused by conditions unlike any they experienced before. What is more they are all thinking of one thing—"profits". It may be called by other names—it may appear to be a matter of sales, of economy, of production. It may be complicated with mergers, inventories or commodity prices. But call it what you want, it still is, basically a matter of profit.

To say that there is untold profit in the depression of today is a statement which requires proof. Looking to the past we can find innumerable cases where the successful businesses of today got their start in the depression of a few years ago. Congoleum, Curtis Publishing Company, Welch Grape Juice Company, Wesson Oil, are a few companies mentioned by Ernest Elmo Calkins in "Review of Reviews" last March when he pointed out how courageous thinking in time of stress had lifted company after company up to the heights of leadership —and profit.

Thinking Big and Little

In the final analysis business is a matter of men and their thinking. Every product we buy was first conceived in thought. The difference between big business and little business, between successful business and failing business, is the difference between the thinking of different men.

Today business is **thinking.** One year ago it was riding the crest of a wave. And therein lies the secret of profits from depression. Waves run on but always break—but out of thinking comes thoughts—ideas—principles that run on and on and on with ever mounting profits.

Henry P. Kendall, in this month's issue of "System" says —"General business conditions of today are such that the management of any business can gain great value from revaluing basic principles."

Let's see what basic principles can be revalued in the light of molded products. To remove any question of theory, here are a few specific cases. For obvious reasons names have been deleted.

Case One: A cosmetic manufacturer studying the basic principles of sales and distribution of his product was convinced that his package was behind the times. Investigation and thinking demonstrated the reality of a new color and beauty trend which affected his product adversely. This condition was just as true last year as it is today but he didn't have time then to worry over falling sales or to think about curing the condition. But the depression started him on a path which lead him to a new material—"Lumarith". His new containers of this sales stimulating material will have a larger market and a greater appeal than ever before. He is making new profits out of the depression—and so is the custom molder who turned to new light-colored molding materials to build up his volume in a depression year.

Case Two: A clock company manufacturing the most accurate movement in the world found sales were not in keeping with the intrinsic worth of their product. They too did a lot of thinking and considerable investigating. Today they know they have the answer to their sales problem—cases for their clocks—molded of "Lumarith".

Case Three: One of the world's greatest electrical companies spent considerable time and thought over the material for a new article. Today they know the sales possibilities of color and beauty—and "Lumarith" is being used.

And so on through dozens of such cases we find business revaluing the basic principles of design—color—beauty. Their thinking will lead them unerringly to the truth that when you add beauty to your product you add volume to your sales. Thus new profits will come through the stirring up caused by depression.

What is true of manufacturers is also true of custom molders. Falling volume of their regular business has resulted in the addition of new departments to seek—sell—and supply new markets with articles molded of the new material—"Lumarith". Here too we see new profits in a depression.

The Seeking Buyer

Experience has proved to us that business is thinking along new lines. For every prospect of a year ago we have fifty today. Buyers who were "not interested" are today wiring, phoning and travelling many miles to secure "Lumarith's" color and beauty advantages for their products. These thinking manufacturers, many wide awake molders and "Lumarith" are all profiting by the new trend. If depression causes thinking, then depression will result in new and greater profits.

Photo courtesy General Plastics, Inc.

Another Cosmetic Line Utilizes Molded Products in Beautifying Packages

Kathleen Mary Quinlan Lotions and Creams are fitted with resinoid closures in keeping with the modernity of the containers

SMART new modernistic packages for the entire line of Kathleen Mary Quinlan preparations were released for sale in New England and the Metropolitan area of New York sometime ago. They met with the instant approval of the buyers and the public and, in the opinion of everyone, the new Kathleen Mary Quinlan style is an artistic triumph. It represents the successful application of modern art to a varied line composed of a great many different packages. It is probably the first time that such a complete specialist's line of toiletries has changed its dress overnight.

Art and Practicability

In designing the new containers, Mr. Ellwood Whitney, art director of the J. Walter Thompson Company, brilliantly carried out Miss Quinlan's ideas of the practicability in art. Modern not only in their fascinating cut, but in their steadiness of poise, jars and bottles will ruin neither one's dresser nor one's disposition by repeatedly insisting on "doing a Wales" on one's favorite boudoir lace runner. They are designed primarily for practical daily use. The molded resinoid caps were chosen not only because of their smart appearance but because easily and rapidly removed and because they offer greater protection against the evaporation of volatile substances. On a dresser, the new Kathleen Mary Quinlan containers provide a decorative and up-to-date note. On a counter, they have the maximum display value and require no additional display accessories and "cut-outs".

The new color scheme is flame, black and opal. The black caps contrast strikingly with the cloudy opal and sparkling crystal bodies. One special item boasts an unusual and very rich-looking container of mirror-black glass, set off with silver. Another comes in a stunning bottle that looks like a slab of green jade. Miscellaneous items now appear in attractive silver and flame cases. The new Face-Powder and Dusting Powder boxes will appeal irresistibly in their singularly elegant and restraining modernism.

The celebrated Kathleen Mary Quinlan eye preparations have won the distinction of having sapphire blue bottles and jars, silver caps and silver labels. This gives particular prominence to these items in which Miss Quinlan was the first to specialize and which have won here an international reputation.

Supervision

Miss Quinlan personally supervises the manufacture of her preparations and the treatments given at her new Fifth Avenue Salon which is a gem of modernistic art striking for the boldness which marks its conception and the restraint evidenced in the execution. The Quinlan preparations have not been hurriedly devised for commercializing purposes. Each cream, each lotion has been created to meet some definite need of the skin, eyes and hair. It represents the perfected achievement of years of study and experiment.

Molders Discuss Costs and Market Extension at Niagara Meeting

Nema Appoints Aumend to Work With Section

THE Molded Insulation Section of NEMA held its second summer session of the year at Niagara Falls, Ontario, at the General Brock Hotel, on Friday, August 22nd. The business sessions took up the entire day, the morning being occupied with the prepared agenda, the entire afternoon, with the section in executive session, on the special report of the trade extension committee on the co-operative advertising campaign.

Twenty four members and guests of the section were present when the chairman, C. A. Kurz, Jr., called the meeting to order. After the roll call and the customary adoption of the minutes of the previous meeting, at Monterey, the chair announced that there had been coniderable activity in reports on closed business transactions since the last meeting, NEMA having received requests for figures of the companies bidding on thirteen different jobs on which contracts had been concluded. In this connection, Mr. Wilson offered for consideration a variation of the present method but in view of a possible broad change throughout NEMA in the matter of reporting on closed transactions, as brought out by Mr. Berresford, the matter was left in the hands of the executive committee for later action.

Cost Accounting Report

Reporting for the committee on cost accounting, Mr. T. W. Howard, auditor for NEMA, said that he had completed his committee on July 21st and, using the National Electrical Manufacturer Association Manual of accounting as a basis, it was devising a system for classification of accounts, a model balance sheet and profit and loss statement, taking into consideration specific applications of the molding industry. He said that this was a step towards devising a system of cost estimating which his committee was to take up at a meeting in New York City in September. Mr. Howard stresed the necessity of having the fullest possible attendance at these conferences and urged executives of all the member companies to have their accountants attend the committee's meeting. Mr. Howard said that the trend in industry in general was toward simplified record procedure but very accurate methods of evaluating costs. The personnel of the committee at present consists of Mr. Howard, NEMA, chairman, W. S. Grove, American Insulator Corp.; E. A. Dick, American Record Corp.; A. L. Wanner, Belden Mfg. Co.; B. F. Conner, Colt's Patent Fire Arms Mfg. Co.; N. L. Stafford, Diemolding Corp.; E. B. Van Deusen, General Electric Co.; J. N. Brown, Kurz Kasch Co.; F. H. Shaw, Shaw Insulator Co.; W. J. Patterson, Westinghouse Electric Mfg. Co.

Commenting on the present status of the Molded Insulation Industry's Trade Practice Rules presented before the Federal Trade Commission in Washington last October, Mr. Berresford said that thirteen member companies have signed the rules, six companies have not signed, and four companies have not been heard from as yet. To date, the Federal Trade Commission has withheld its decision because of a recent ruling by the Attorney General's office. However, there will be a discussion before the standing committee of the commission at Niagara Falls on September 25th at which time there will be present a representative of NEMA. The final decision of the Commission is expected on October 25th.

Elections Next Meeting

Before closing the open meeting, Mr. Kurz suggested that the section hold its next meeting at Old Point Comfort during the week of October 20th, at which time the anual meeting of NEMA is held. This suggestion was adopted and among other things, election of officers for the following year will be held at this time.

Luncheon followed in one of the private dining rooms of the hotel and immediately afterwards, representatives of the member companies went into executive session. During this time the guests at the meeting enjoyed the attractions that the Falls abound in, such as the Cave of the Winds and the Great Scenic Gorge Trip.

After luncheon, the members went into a closed executive session, spending several hours discussing the findings of the Trade Extension Committee bearing on such topics as co-operative and individual company advertising and market research. An extensive report of the committee's recommendations and the means for executing them will appear in a subsequent issue of PLASTICS.

In the course of the meeting, Mr. Berresford, managing director of NEMA, introduced Mr. E. S. Aumend, recently appointed to the headquarters staff of NEMA. Mr. Aumend

(*Continued on page 541*)

TYPEWRITER SPACE BARS ARE MOLDED OF DUREZ

DIEMOLDING Corporation is molding a new typewriter space-bar for the L. C. Smith Typewriter in colors to match the finish of the typewriter body. Most popular is the olive green which is carried out in the color scheme of typical suites of office furniture, including filing cabinets, safes, shelving and closets.

The space bars were heretofore made of metal and then finished with an enamel of the desired color. In general, these had to be dulled so that the reflection from the glossy surface did not bother the typist. Now the space-bars are molded of Durez, taken from the die finished in the desired color and ready for assembly in the typewriter.

Plastic Materials in Paris Styles

By P. H. Chase

Du Pont Style Service, Paris, France.

A great deal of emphasis is being placed on plastic materials as a part of the vogue at the present time by the leading houses of Paris who are important as style leaders. This comes about because costume jewelry is now regarded as correct more than ever, and so-called fancy jewels have taken a leading place in feminine accessories. Color is the important factor since it has so much to do with making or marring the ensemble, and plastic materials naturally can reproduce not only all shapes, but the most intriguing colors as well.

These fancy jewels are sometimes quite heavy and now special boudoir cups are being designed to hold them. These, too, are made of plastic materials, usually in most attractive color schemes. Among some of the interesting ones just offered is a double handled cup resting on a flat base. It is of amber yellow with the base in black and the decorations about the rim in black. Another is a rather squat bowl in turquoise blue with a marble effect. A third suggests the Grecian cup in ivory with the base on which it stands in black. Still another is of ash green. Opaline pink for the bowl and a black base are the colors of a fifth cup.

Heavy necklaces now seem to be the vogue and the beads are made in various sizes. Slave bracelets in engraved plastic material are again making their appearance. Another novelty is a thick black rayon thread necklace with motifs in plastic. This was meant to be worn with a dress by Doeuillet-Doucet designed in geranium red chiffon. Another attractive necklace was in double strands made of silver threads holding dark blue plastic motifs. This was to be worn with a dress designed by Jeanne Lanvin in midnight blue chiffon.

Other novelties in plastic material, all of which are sponsored by the fashion leaders, consist of a black fan set on a red plastic frame, which also was designed to accompany the dress by Doeuillet-Doucet; new buckles for the new models in handbags; straight handles of plastic imitating jade or pink quartz for the new parasols, and a great number of bracelets in all colors.

Industrial Designers Study Adaptability of Bakelite Molded

THE problem of conforming the design of a molded part to the limitations of the molding process is being given competent consideration by artists and designers today. Bakelite Corporation announces a list of four specialists who have undertaken a study of Bakelite materials in order to better qualify themselves to design artistic pieces which are pracitcal from the molder's standpoint. Their names are as follows:

Mr. Henry Dreyfuss, 380 Fifth Avenue, New York City; Mr. Arthur S. Allen, New York Central Building, New York City; Merchandise Counsellors, 11 West 42nd Street, New York City, Attention of Mr. S. R. Hollander; Mr. Simon L. DeVaulchier, Stuyvesant Publishing Company, 572 Madison Avenue, New York City.

British to Run Technical Plastic Classes

THE London Borough Polytechnic Institute, finding that the course of lectures given at the commencement of the year on synthetic resins and plastics had met with great success, have decided on another series in September. The course is to include about thirty lectures concerning the manufacture, properties and uses of synthetic resins and plastics.

The lecture course covers the manufacturing of synthetic resins, including phenol and urea-formaldehyde, glyptal resins, etc., the production from synthetic resins of molding compounds, the use of plasticisers, accelerators, fillers, and fluxes, thermoplastics and the manufacture for records of shellac compounds, pitch and bituminous compounds, particularly appertaining to battery box making, celluloid, clay, fireproof and porcelain materials, carbon mixings and brush making, the theory of molding, (hot and

cold), design of molds, molding plant and equipment and mold materials, properties of moldings and methods of test and testing.

Then follows a practical course which embraces; hydraulic plant and equipment, heating of molds and presses, plant maintenance, mold design for different types of moldings and compounds, cold, hot, and automatic molding; operations after molding, such as stoving, finishing, and spraying; detection and cure of common molding defects, reduction of the time cycle and finishing costs, inserts, inspecting and testing of moldings. In this course instruction in the manufacture of molding compounds, phenol-formaldehyde, etc., will be given, as also the choice and use of fillers, coloring matters, and accelerators.

A special laboratory has been equipped and considerable apparatus installed, including: small-scale digester and still for the manufacture of gallon quantites of resins; special laboratory mixer; resin grinder, preformer and polishing apparatus; upstroking hydraulic press (hand operated) and also hand-operated hydraulic press, with gas-heated plates.

The above named course of lectures and the practical classes are under the direction of L. M. T. Bell, A. U. C. N., whose great experience of synthetic resins, insulation, and molding, should prove of great value.

There is also scheduled a course of ten lectures by W. D. Owen, A. M. I. E. E., of the Electrical Research Association, on the subjects of synthetic resins, their chemical, physical, and mechanical properties.

French Molding Powders Popular in Europe

A French molding powder which has achieved considerable popularity on the Continent is thiojectite, a material similar to many other phenol powders, but possessing one remarkable distinguishing characteristic—it cannot exceed a certain degree of polymerization, in that it cannot reach stage C. It is claimed that, as a result of this special quality, thiojectite abolishes the tendency of molded articles "working" after being processed, due to a slow polymerization produced by insufficient initial baking. This characteristic further allows the use of a very fusible material, which can be molded by injection or compression without long periods of baking. It is but slightly affected by heat, and can be molded in a high temperature, which permits rapid molding.

Another molding powder which has recently found its way on to the French market is a new patent comprising a mixture of ebonite and synthetic resin. It possesses excellent insulating qualities, and is more heat-resistant than ordinary ebonite. It is molded under similar conditions and as easily as synthetic resin powders, and is especially resistant to chemicals and even alkalis.

BIGGER THAN BALANCE SHEETS

Leaders of Industry Go on Record Against Wage and Salary Cuts

By Roy Dickinson

SUCH an article at this could not have been written ten short years ago. During the entire industrial history of the world, a period of depresion inevitably meant an attack on the wage scale. Salary and wage cuts were always considered a sound and sensible procedure when there were more men than jobs; when hard times came.

To have asked industrial leaders to go on record against a mental attitude toward wages and salary which was a generally accepted as the law of gravity, would have brought only accusations of radicalism or insanity.

I know, because a minority report against a general policy of wage reductions that I signed at President Harding's Unemployment Conference during our last period of depression was signed by one other man, the late Samuel Gompers. The employers present, and there were fifty of them, either wanted wage cuts or were unwilling to go on record against them. Then it was almost an axiom that wage cuts would bring back normal times.

Today a new point of view prevails, stated so well by George F. Johnson, president of Endioctt-Johnson in his telegram to Printers' Ink: *"Reducing income of labor is not a remedy for business depression, it is a direct and contributing cause."*

After the Chrysler salary cut, which made the front page of the press, I wondered whether the same old cycle of cuts was due to follow, with the resulting cuts in purchasing power, causing poorer business elsewhere, followed by other cuts and so on in a widening and vicious circle, or whether some men had a newer viewpoint.

H .H. Franklin, in response to a wire, went on record in Printers' Ink to say: "Corporations rather than employees should bear burden of temporary slowness in business." It seemed to me like a big idea. So I picked out first fifteen and then ten additional large employers of labor in various parts of the country and sent each a wire. It was a typical cross-section of different industries, separated widely geographically. No attempt was made to pick known liberals.

William Cooper Procter, with his guaranteed employment plan, Dennison of Framingham, well-known liberal, Owen Young and Henry Ford, who have pre-

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viously expressed themselves, are not represented in the views which follow.

My list consisted of business men not usually willing to be quoted for publication. My wire asked them to express a definite opinion on the controversal subject of wages.

As was natural, some of them were unwilling to predict what they would do. But the surprising thing is that a majority of those who replied are willing to stand up and be counted as against wage and salary reductions. I consider that fact of prime importance for the immediate future of business.

In general terms, the new spirit against wage and salary cuts means that the purchasing power of the great consuming public is not going to be greatly decreased. Buying will keep on in the face of a curtailment in production. The combination is a sure stimulus to a speedy business recovery.

* * *

The first reply received came from the Pacific Coast, where the Paraffine Companies, big employers of labor, come out straight from the shoulder:

R. S. SHAINWALD
President
The Paraffine Companies, Inc.

"Replying to your request would state the Paraffine Companies, Inc., has made no reductions in personnel of its manufacturing, sales or office organizations, nor has it made any wage cuts before or since the depression beginning last fall. It believes such reductions can and should be avoided."

If Mr. Shainwald were operating the business for immediate dollar sign results only, he might have shown greater results if he had laid off a few hundred people, and announced a 10 per cent wage and salary cut. I present him and his wire as a star example of the new spirit in management. A man who is working for national profits, making his city a better place to sell the product of other men's factories, the results of other workers' labor.

Admittedly playing the strongest cards early in the game, for I agree fully with this attitude, I next present the views of:

J. A. FARRELL
President
United States Steel Corporation

"Referring to your telegram of July 21, I think I can best answer you by quoting from my remarks at the May 9, 1930, meeting of the members of the American Iron and Steel Institute, which was held at the Hotel Commodore, New York City, as follows:

"I heard a steel man say the other day, in fact more than one recently, that wages should come down. I said, 'Oh no, wages in the steel industry are not coming down; you can make your mind up to that fact.' I said, 'If you are going out to sell your goods and eliminate your profit and expect to get it out of the men in the mills you are greatly mistaken.' Than I said, 'Make up your mind to one thing, use better judgment in your selling prices for your material and get rid of the idea that wages are going down.' Because, Mr. Schwab, wages are not coming down in the steel industry. That would be just begging the question. We all know that just as soon as they go down, if they should, Mr. Customer gets it. It is like some shipowners who complain about the Panama Canal tolls; if the Panama Canal tolls were reduced or abolished the merchant abroad would get the benefit of the reduction and the taxpayers here would pay for it; certainly shipowners could not retain the saving.' "

Mr. Farrell's letter surely indicates the new spirit in business. It indicates a new type of leadership in a basic industry. What Mr. Farrell said should be read by every manufacturer who thinks that wage and salary cuts are an easier way of keeping up profits than better selling methods.

In a totally different line of industry, but equally outspoken and direct is:

C. R. PALMER
President
Cluett, Peabody & Co.

"In my opinion a general reduction of wages and salaries at this time is entirely unwarranted. Such action would be demoralizing and tend to bring about the very conditions we are all striving to avoid. Prosperity and high standards of living in this country are largely the result of good wages.

A. C. LORING
President
Pillsbury Flour Mills Company

"We have not contemplated any reduction in wages now or in immediate future."

Short and to the point. Pillsbury's is a big plant. If it should announce a wage and salary reduction of 15 per cent there would be several hundred thousand dollars less a month passing across the retail counters of the stores of Minneapolis. The fact that pay-rolls will be intact is news that stimulates buying. The new spirit in industry starts a virtuous, not a vicious, circle in motion.

* * *

When the small employer of labor knows that many of the big ones are willing and anxious to stand out against wage and salary cuts, he may follow along. A good example goes a long way. If bad news travels fast, good news can be carried far.

Credit is due to the men who won't cut that part of the national purchasing power for which they are responsible, and who are willing to stand up in meeting and say so. I have presented some of them here. There are others.

Maintaining purchasing power at the source is the most important job in the country today—a bigger job than a slightly better balance sheet. For wages buy more shoes and automobiles than dividends, and "the best place to start reductions of income is from the overpaid, not the underpaid."

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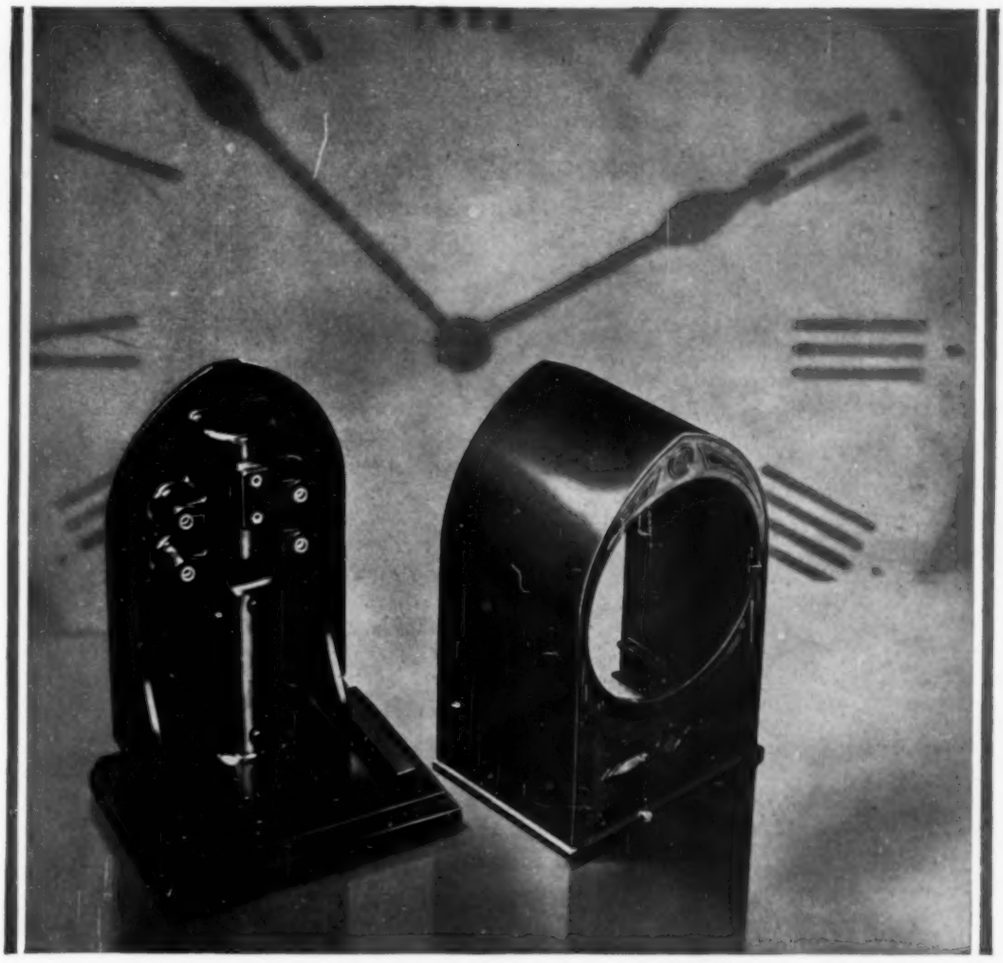

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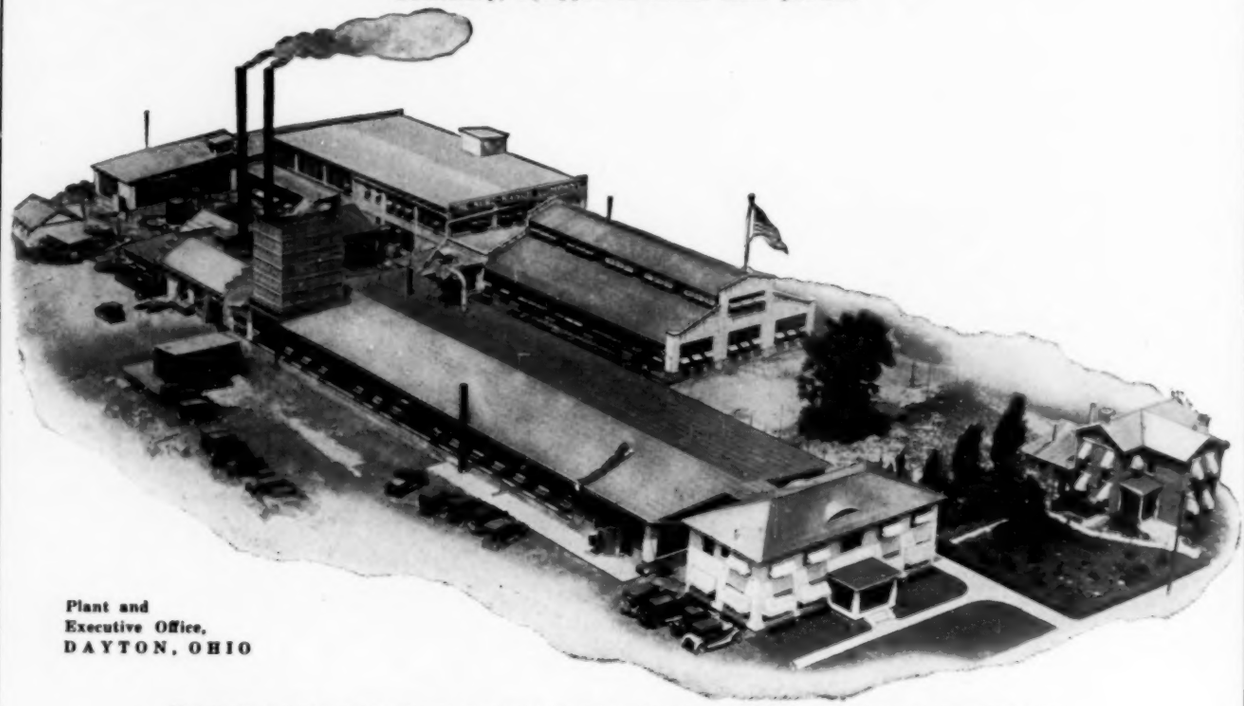

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Quigley to Present Paper

LEON V. Quigley, Director of Publicity, Bakelite Corp., will present a paper at the joint meeting of the A. S. M. E. and the A. S. S. T. in Chicago at a session devoted to the molding of phenolic materials on September 23rd. His subject will be "Engineering Factors Involved in the Replacement of Metals by Resinoids."

Roessler and Hasslacher Organization Changes

AT a meeting of the Board of Directors of The Roessler & Hasslacher Chemical Company held Monday, August 25, 1930, Dr. Edward A. Rykenboer was elected a member of the Board, replacing Mr. George F. Hasslacher who resigned as Director and Assistant Secretary on July 28th.

Dr. Rykenboer is a graduate of the University of Rochester 1912 and took his Ph. D. degree at the University of Michigan where he taught, after his graduation, until 1917. In the same year he joined the Roessler & Hasslacher forces at Niagara Falls as a research chemist and from that position became Superintendent of Production and is now General Superintendent of the Niagara Falls plant of The Roessler & Hasslacher Chemical Company. The geniality of Dr. Rykenboer makes him a great favorite with his associates.

At the same meeting Mr. J. Carlisle Swaim was elected Assistant Secretary.

Mr. Swaim is 41 years of age, holding the A. B. 1911 and M. A. 1913 degrees from Vanderbilt University, Nashville, Tennessee, also LL.B. 1915 from Columbia University Law School

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where he also did a year's post graduate work in law. After leaving the Army he became associated with the law firm of Merrill, Rogers, Gifford & Woody where he remained in the general practice of law until, as Resident Counsel, he became associated with The Roessler & Hasslacher Chemical Company in November, 1928.

MOLDERS' MEETING

(*Continued from page 535*)

will be directly concerned with the activities of the section and immediately after the meeting will make a tour embracing many of the member companies' plants. He was formerly assistant to the president of the Commercial Credit Corporation.

In his connection during the past year with the corporation he has just left, his duties were the general supervision of branches in New England, New York and New Jersey. He devoted particular attention to the development of the sales ability and efforts of the various branch manager; also had the contacting with and closing of the larger accounts.

Previous to that connection, he spent a period of ten years with Willys Overland, Inc., progressing from clerk to department head and executive. His experiences and duties were of a broad nature and covered the development of wholesale and retail operations, control of financing, both wholesale and retail, and the responsibility for the accounts and notes receivable of one of the larger branches; he functioned as the New York branch manager of the organization's subsidiary retail finance company and was in

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MARCH OF THE MOLDED CLOSURE

(*Continued from page 529*)

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ed with tin or aluminum is found in the story of the little glass jar of modernistic design which could not be admitted to the Metropolitan Museum of Art exhibtion of glass and rugs, even though pictured on the poster announcing the display. At the request of the authorities, this jar was sent to the Museum to be included in the glass exhibit. But it could not be submitted without a cover, for the top was finished with screw threads, showing that a closure of some kind was obviously intended. Metal covers were tried but found wanting from an artistic standpoint. And the little jar was, after all, excluded from the exhibit, although through its beauty it continued to attract the eye of the passer-by to the poster announcement.

Manufacturers Want Beauty in Closures

There is more to be drawn from this little story than simply the need for artistic closures —of plastics or other materials. The Lippincott Company of Cincinnati, is now using this same design for marmalade and jam jars. Thus, every woman who buys the Lippincott brand may have on her table, at the cost of only a few cents, a bowl created by one of America's famous artists, and considered by the New York Metropolitan Museum of Art worthy of entrance in a display of the world's most beautiful modernistic glassware. It is because this is a machine age, an age of mass production, that the pleasure of owning such a thing of beauty is not confined to the wealthy few, but is given to the great majority, whose love of beauty is just as great, but whose opportunity for enjoying it has previously been limited. And it is because this is an age of mass production that resinoid closures, made by the gross in a unit molding operation, and in designs worthy of the glassware they complete, may one

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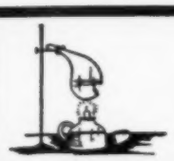
day be considered standard in every food canning factory.

Beauty is not always the best argument in favor of a resinoid closure. In one interesting instance, cited by an executive of a leading glass company, if appearance were left entirely out of the question, the molded closure would still be more satisfactory. This company has placed on the market a refrigerator bottle, very attractive in design, with a blue enamelled screw cap of tin. It is called a refrigerator bottle because it nests so compactly next to the ice in an ordinary refrigerator, or beside the ice-cube drawers of an electric refrigerator. Water can be cooled more rapidly in this than in ordinary glass jars because of the greater surface exposed to the cold temperature of the ice-box. The wide mouth makes refilling and pouring easy. The interesting design enables even the most fastidious hostess to take her ice water directly to the table for serving. All in all, it is an ideal bottle for the purpose intended, but —metal caps will rust in a moist atmosphere, and a rusty capped bottle will make any drink unattractive. Here is, in this instance, the chief advantage of the molded closure, for a moist atmosphere has no effect in the phenol resinoids. In such a bottle as this—to be used until broken—the long wearing properties of the Bakelite closure would indeed be an advantage, for in many well regulated families breakage of glassware is not common. In fact, it is quite possible that a hundred or two hundred years hence, glass collectors will scour the country for fine examples of modernistic period glassware—marmalade jars, tabasco sauce bottles, handy flacons, shoe polish bottles, refrigerator bottles, and the like. And it is safe to say that those bottles bearing phenol resinoid molded closures of graceful design will have a higher value than others whose metal caps have long since yielded to a century's atmospheric corrosion.



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WE all see signs of better business . . . who sees the profit? . . . Now that Kelley gets back to Chicago, Ed. Bachner can go on vacation . . . Henry Kasch comes back too . . . from the West Coast, where he went in two cars with the whole family . . . Our old associate, Maguire, no longer handles Catalin in Chicago . . . From all reports, Detroit is no place to start a molding plant . . . Yet business seems about 15% better than last month . . . If you want to see what that was, look it up yourself . . . pyroxylin, however, is still quiet . . . The Amtorg investigation isn't going to open any locked doors in this industry . . . there is such a thing as being too big a sucker . . . Ben Conner is on vacation . . . bet he brings back some business . . . We hear there are a lot of rejects in these cut-price tube bases . . . and we're not surprised, knowing who does the cutting . . . The present standard price is ideal for everybody . . . Alden starts up again, under another name . . . Closures come in for a lot more discussion . . . and concentration . . . interest is even greater in the new materials . . . Swanson (of Cutler-Hammer, Boonton Molding etc.) is now with Regalite . . . Speaking of Boonton, Scribner is back from a vacation . . . and speaking of Cutler-Hammer, see John Rossiter . . . aside to H. B. . . . the Stephenson mentioned last month is the brother of the man at Insulation Products, Pittsburgh . . . on pain of death we again say, watch urea . . . September will see a good increase in business . . . some misguided people came to the Molders' Meeting to see the Falls . . . Belden's Richmond plant is going great guns . . . there may be some new preforming machinery very soon . . . while the industry, generally, keeps kicking about small orders there are, nevertheless, some good-sized ones . . . Our thought for the month; how fast is Ambition? . . .

WE hasten to apologize for the tight mailing-envelopes used on this year's Guide Book. The error in size was perfectly natural and unavoidable, and if any copies were received in bad condition we shall be glad to send replacements. Yet we are gratified at the reception given this edition and the kind words passed on to us by our subscribers who have found its information valuable. We would like them to criticize and comment on its contents or make-up, so that we may be guided by their wishes in the future.

READERS of the INDUSTRIAL BULLETIN of Arthur D. Little, Inc., noticed in the August issue an article entitled "Why Plastics?". We had the pleasure of cooperating with their staff in its preparation, and believe that such publicity is of the utmost importance to the industry. As part of our work, we were called upon to define plastic materials and evolved the following:

"Those natural and synthetic resins and cellulose esters and ethers which may be caused to assume a definite shape either by a chemical reaction or by the influence of heat and pressure in a metal mold."

Are there any comments? This is the first time, we believe, that anyone has attempted to define the materials considered as plastics, and it is, as one man says, "only natural that PLASTICS should do so". Natural, yes; but important enough to take credit for.

THE Amtorg investigation, mentioned previously, demands more than casual consideration. *Chemical Markets* has had the courage to make an even further exposure of the methods adopted by this corporation, saying, in part, that the loss of export business that Amtorg threatened to bring about amounted to less than two per cent. of our foreign business. There has been a growing feeling, within the plastic trade, that information has been procured under false pretenses and that, under the guise of buying activity, privileges have been extended to Amtorg representatives that many have regretted. It is undeniably serious to accuse a large and powerful business organization, but the mere fact that the organization is large and is powerful should not hinder any man from insisting on a code of ethics in keeping with his own. It is, perhaps, impossible for a domestic business man to appreciate the astuteness of a political organization.

JUDGING from our mail, there is some improvement in employment. Yet we are still receiving, as we probably always will, many peculiar appeals that relieve, to some degree, the serious job of publishing. What, for example, is in back of one man's request for samples of ground glass? Is he a gangster? Also what relation, if any, has a molded cork-screw and bottle-opener to the Niagara Falls meeting? Perhaps these demands indicate that some people could be better employed. At any rate we can think of one very definite occupation for the man who has ideas on molded flag poles. He should be made to sit on the top of one in a stiff gale.